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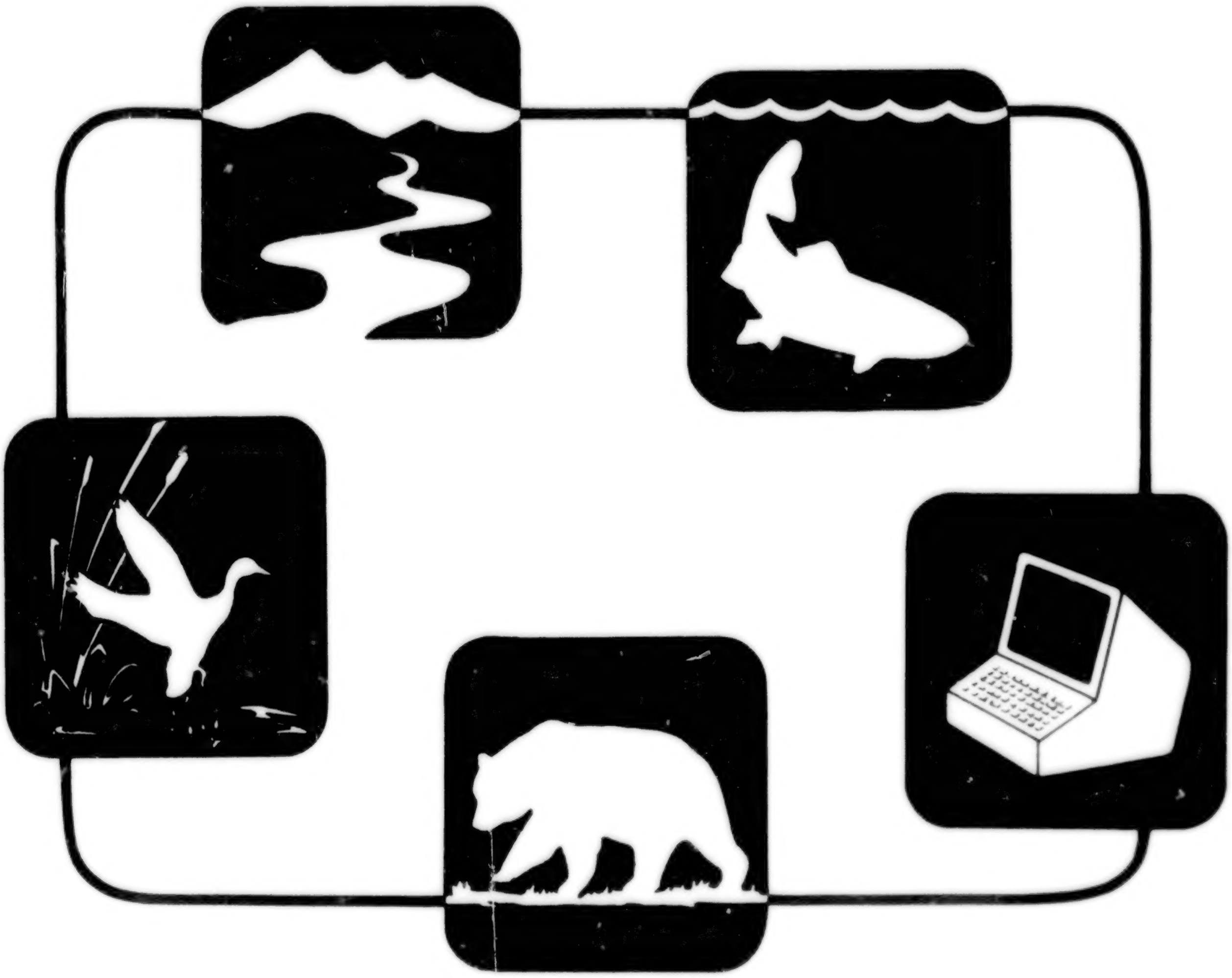
BIOLOGICAL REPORT 85(12)
JUNE 1985

ORIGINAL

FWS/OBS SERIES ANNOTATED BIBLIOGRAPHY: COMPLETE LISTING AND SUBJECT INDEX



Fish and Wildlife Service

U.S. Department of the Interior

This is one of the first reports to be published in the new "Biological Report" series. This technical report series, published by the Research and Development branch of the U.S. Fish and Wildlife Service, replaces the "FWS/OBS" series published from 1976 to September 1984. The Biological Report series is designed for the rapid publication of reports with an application orientation, and it continues the focus of the FWS/OBS series on resource management issues and fish and wildlife needs.

Biological Report 85(12)
June 1985

FWS/OBS SERIES ANNOTATED BIBLIOGRAPHY: COMPLETE LISTING AND SUBJECT INDEX

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FOREWORD

Fiscal Year 1985 marks the end of the first decade of the Biological Services Program and of the Division of Biological Services. Ten years ago the U.S. Fish and Wildlife Service was confronted by two major events: increasing Federal interest in energy and water development, and a growing national environmental awareness and ethic. In the wake of the National Environmental Policy Act and Project Independence, government and private interests were struggling to better identify and avoid or mitigate adverse impacts on our Nation's living resources. From this challenge came the Office of Biological Services, which became the Division of Biological Services (DBS) in 1982.

Biological Services was established to accomplish the following threefold mission:

* To strengthen the Fish and Wildlife Service (USFWS) in its role as the primary Federal source of information on fish and wildlife resources, particularly in respect to environmental impact assessment;

* To gather, analyze, and present information to aid decisionmakers in the identification and resolution of problems associated with major land and water use changes;

* To provide better ecological information and evaluation for Department of the Interior programs, such as those relating to energy and mineral development. (USFWS, Annual Report, 1976).

To achieve this mission, DBS launched a program employing many strategies: centralized, specialized National Teams; a heavy emphasis on information transfer to bridge the gap between traditional research and policy-makers; reliance on analysis and synthesis of existing information where possible; fostering multidisciplinary skills and solutions; and flexibility to accommodate changing needs.

At its inception, DBS defined a series of projects: Coal; Water Resources Analysis; Systems and Inventory; Geothermal, Mineral and Oil Shale Resources; Coastal and OCS Development; Power Plant; and Information Transfer. From these have come the variety of tools, technologies, and products associated with DBS. DBS has emphasized fish and wildlife habitats, and methods to analyze and inventory those habitats. Major contributions include:

* Habitat Evaluation Procedures - This family of technologies was designed to evaluate proposed impacts to fish and wildlife that might result from human activities, including: reservoir projects; channelization; surface mining activities; other habitat alterations; or wildlife management actions. These technologies include the development of habitat models for estuarine, inland aquatic, and terrestrial species, with almost 100 models published to date.

* Instream Flow Incremental Methodology - This methodology assesses the effects of stream flow changes on recreation and fisheries resources. It has been used to assess habitat and determine instream flow needs in at least 300 applications. Some of the more notable applications include the Terror River in Alaska, the Snoqualmie and Skokomish Rivers in Washington, the Trinity River in California, the Colorado River in Colorado, the Chattahoochee River in Georgia, the Potomac River in Maryland and Virginia, and the Tweed River in New South Wales.

* Atlantic, Pacific, and Gulf Coast Ecological Inventory - Maps on a scale of 1:250,000 were developed for planning so that decisionmakers could identify important fish and wildlife resources. Coastal areas containing important fish and wildlife resources and habitat were the focus of this effort. Maps were developed which delineated the known distributions of animals and plants, the values of habitats, protected areas (e.g., parks), and values of mineral and water resources.

* National Wetland Inventory - In response to the increasing recognition of the roles and importance of wetlands, DBS initiated a project to develop a scientifically sound definition of wetlands, a system to hierarchically classify wetland communities, and a method to inventory wetlands in the United States. Using these products, DBS initiated the National Wetland Inventory (NWI) and conducted a statistical sample to determine the rate of wetland change or loss during the period 1955-1975.

* Community and Estuarine Profiles - This ongoing report series describes particular coastal and estuarine ecosystems and their values. These reports synthesize existing ecological information that is pertinent to a specific estuarine or coastal community (e.g., Pocosins) or geographic area (e.g., Apalachicola Bay, FL). They provide information on the dynamics of the ecosystem or community, and the impacts of man's development on that system.

* Air Pollution and Acid Rain Series - These reports discuss the issues and impacts of acidic precipitation. The series addresses both aquatic and terrestrial resources in affected areas of the U.S. The 19 reports currently comprising the series provide some of the most comprehensive information available on surface water vulnerability, mitigation strategies, and biological effects. A mitigation research program implemented in FY85 involves cooperative agreements

with five States and will produce guidance documents for protection and rehabilitation of aquatic resources impacted by acidification.

* Planning and decisionmaking tools - A number of decision support tools have been used to develop and evaluate management or mitigation strategies. Several of these tools recognize that fish and wildlife issues can seldom be separated from more complex natural resource issues involving multiple Federal and State agencies. These decision tools provide a basis for multiagency collaboration and a mechanism allowing for FWS input to natural resource decisions or negotiation planning. One example of such a tool is the Adaptive Environmental Assessment approach.

* Data bases and Computer Applications - Computer tools developed by Biological Services include geographic information systems, bibliographic data bases, models of species life requirements, habitat data bases and models, wetland ecology data bases, data bases of plant and wildlife variables (e.g., PROCEDURES), instream flow information systems, statistical packages, and data base management aids such as MANAGE.

* Geographic Information Systems (GIS) - GIS components can be used by biologists and managers to address land use planning and resource management issues. These components include the Analytical Mapping System for map data capture, the Map Overlay and Statistical System (MOSS) for data analysis, and the Cartographic Output System for high quality map production.

* Power plant reports - Between 1975 and 1980, DBS developed a series of technical reports that addressed environmental concerns surrounding electric power generation and transmission. Guidance was provided for assessing impacts of coal-fired power plants on fish, wildlife and their habitats and for wildlife management of transmission line rights-of-way. Staff provided critical imput in the landmark decision on the Hudson River case on entrainment/impingement at once-through cooling systems in steam generating stations, saving utilities and rate-payers nearly one-half billion dollars in construction and 100 million dollars in maintenance costs.

* Publications - The Biological Report series (formerly FWS/OBS) is directed toward operational staff and decisionmakers. The series focuses on solutions to resource management problems. The attached, annotated bibliography of the FWS/OBS technical report series, published from 1976 to September 1984, contains 635 reports. Over 800,000 copies of these reports have been distributed in Biological Service's first decade.

* Stream Modification Guidelines - Flood protection and land improvement measures for the individual land owner were enhanced while preserving fish and wildlife resource values by incorporating stream alteration techniques and alternative methods for accomplishing program objectives into joint FWS/Soil Conservation Service

guidelines. Protection and management of woody wetland and riparian communities has been facilitated by the information base developed on the influence of water levels on woody plant species, also part of the National Stream Alterations project.

* Training - Workshops, briefings, symposia, and informal and formal training events sponsored by DBS have been instrumental in elevating technical awareness among FWS field personnel. Over 20,000 people have received training in DBS technologies, including Geographic Information Systems (GIS), Habitat Evaluation Procedures, Instream Flow Incremental Methodology, Wetland Classification, MANAGE, community and habitat modeling, use of coastal ecological characterization products, and related subjects.

DBS has also emphasized coordination and cooperation with other Federal agencies and with State governments. This has led to shared projects, resources, and capabilities as well as to improved cooperation among agencies. Many DBS tools have been adopted by other agencies and States. The major goals of the DBS program have been development of technologies to answer resource management problems, effective transfer of those technologies to other agencies, and providing support through training and technical assistance. Once an agency is self-sufficient in using a DBS tool, we are free to develop a new technology.

One of Biological Services' trademarks has been adaptability. Deliberately established to be flexible and responsive to changing needs, in its first decade Biological Services has created, merged, moved and abolished a series of National teams. The National Stream Alterations Team was merged with the Western Water Allocation Project at the Western Energy and Land Use Team; the National Power Plant Team was merged with the Eastern Energy and Land Use Team, and went on to form the core for the Service's acid rain activities; after development of the system for classifying and mapping wetland and deepwater habitats, the National Wetland Inventory Group was transferred from Biological Services to operations, as was the core of expertise -- the Regional Teams -- placed by Biological Services in the Regional Offices.

As needs, budget, and organization have changed, Biological Services has adjusted its activities to meet the needs of the future. Building on past achievements, possible future areas of activity include improving our ability to identify and quantify cumulative impacts; expanding our analyses of species/habitat relationships to address communities; and improving our basic ecological understanding of wetland resources. We will also continue to expand the use of our existing technologies to new applications.

We are pleased with our record of assistance to the Service and to other natural resource managers, and look forward to the challenges of the next decade with excitement.

Edward T. LaRoe

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INTRODUCTION

This bibliography contains entries for all publications included in the Fish and Wildlife Service (FWS) series, "FWS/OBS". This series was initiated in 1976 by the Office of Biological Services (OBS), hence the designation "FWS/OBS". Offices formerly in the OBS are now part of the Division of Biological Services, Research and Development. In October 1984, the FWS/OBS series was replaced by the Biological Report series. This bibliography thus serves as a final record of the complete FWS/OBS series. Included are FWS/OBS series publications of the Eastern Energy and Land Use Team, the National Coastal Ecosystems Team, the Western Energy and Land Use Team, and a few Regional Office products.

ARRANGEMENT OF ANNOTATIONS

Entries are arranged by FWS/OBS number. The first two digits usually pertain to the year of publication or the year in which a subseries was initiated. (See, for example, the 82/10 series.) Basic bibliographic information and a brief annotation are included for each publication. In several cases, a single annotation has been used to describe a group of similar publications or a subseries. These "series" abstracts are indicated by asterisks (see, for example, page 10).

Some of the manuscripts assigned FWS/OBS series numbers have, for a variety of reasons, never been published. These unused numbers are indicated in the bibliography, but have been omitted from the availability listing.

KEYWORD INDEX

The keyword-in-title index provided here contains significant subject and geographical terms used in each publication's title. Major subseries names, e.g., the Habitat Suitability Models and the Instream Flow Information Papers, have also been listed.

AVAILABILITY INFORMATION

The annotations section is followed by availability information. An "X" or a number in the columns labelled "EELUT", "NCET", "OTHER", "WELUT", "NTIS", and "GPO" indicate that a particular publication is available from that source.

Publications available from EELUT may be obtained by contacting:

Publications Manager
Eastern Energy and Land Use Team
U.S. Fish and Wildlife Service
Box 700
Kearneysville, WV 25430
(304) 275-2061 FTS 925-5354

For copies of publications available from NCET, contact:

Information Transfer Specialist
National Coastal Ecosystems Team
U.S. Fish and Wildlife Service
Slidell Computer Complex
1010 Gause Boulevard
Slidell, LA 70450
(601) 688-2091 FTS 685-6511

WELUT publications may be requested from:

Information Management Services
Western Energy and Land Use Team
U.S. Fish and Wildlife Service
2627 Redwing Road
Fort Collins, CO 80526-2899
(303) 226-9300 FTS 323-5300

Publications available from the Government Printing Office (GPO) may be obtained by contacting:

Superintendent of Documents
Government Printing Office
Washington, DC 20402
(202) 783-3238

They may also be available from any of the regional GPO bookstores. Costs will vary, but are generally less than for the same publication from the National Technical Information Service (NTIS).

Photocopies of the majority of reports in the FWS/OBS series are available from NTIS. Prices can be determined by referring to the following table, which relates publication length, i.e., pages, to cost.

Standard priced documents and microfiche.

Price code	Page range	Price	Price code	Page range	Price
A01	Microfiche	$ 4.50	A14	301 - 325	$25.00
A02	001 - 025	7.00	A15	326 - 350	26.50
A03	026 - 050	8.50	A16	351 - 375	28.00
A04	051 - 075	10.00	A17	376 - 400	29.50
A05	076 - 100	11.50	A18	401 - 425	31.00
A06	101 - 125	13.00	A19	426 - 450	32.50
A07	126 - 150	14.50	A20	451 - 475	34.00
A08	151 - 175	16.00	A21	476 - 500	35.50
A09	176 - 200	17.50	A22	501 - 525	37.00
A10	201 - 225	19.00	A23	526 - 550	38.50
A11	226 - 250	20.50	A24	551 - 575	40.00
A13	276 - 300	23.50	A25	576 - 600	41.50
			A99	601 & up	a

[a] Add $1.50 for each additional 25-page increment, or portion thereof.

Publications can be obtained from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650 or FTS 737-4650

BIBLIOGRAPHY

FWS/OBS-76/01.1. WILDLIFE AND OIL SHALE: A PROBLEM ANALYSIS AND RESEARCH PROGRAM: VOLUME 1. Hubert D. Burke. 1975. 100 pp.

This publication analyzes the probable consequences of oil shale development in Colorado, Utah, and Wyoming. Research about the natural and social environment of the Rocky Mountain oil shale region was reviewed. Ten "priority studies" are outlined and recommended, and suggestions for mitigation of undesirable impacts are given.

FWS/OBS-76/01.2. WILDLIFE AND OIL SHALE: A PROBLEM ANALYSIS AND RESEARCH PROGRAM: VOLUME 2 - APPENDIX AND BIBLIOGRAPHY. Hubert D. Burke. 1975. 131 pp.

This publication provides references for use with Volume 1 (FWS/OBS-76/01.1).

FWS/OBS-76/02. BIOLOGICAL SERVICES PROGRAM - FISCAL YEAR 1975. 1976. 52 pp.

The program operations and studies of the Office of Biological Services are discussed for fiscal year 1975. Projects include coal, oil shale, Western water allocation, geothermal energy, coastal ecosystems and outer continental shelf development, power plants, stream alterations, national wetlands inventory, biological indicators, and information transfer.

FWS/OBS-76/03. METHODOLOGIES FOR THE DETERMINATION OF STREAM RESOURCE FLOW REQUIREMENTS: AN ASSESSMENT. Clair B. Stalnaker and J. L. Arnett. 1976. 199 pp.

A workshop on instream flows resulted in instream flow methodology developments in the areas of fisheries, wildlife, water quality, recreation, and aesthetics. Each area is described in a separate report section.

FWS/OBS-76/04. FISH AND WILDLIFE IMPLICATIONS OF UPPER MISSOURI BASIN WATER ALLOCATION: A RESEARCH ASSESSMENT. William B. Lord et al. 1975. 114 pp.

Research opportunities regarding energy development impacts on fish and wildlife resources in the Upper Missouri River Basin are evaluated with emphasis on water allocation changes. Recommendations for mitigating potential problems are included.

FWS/OBS-76/05. AN ASSESSMENT OF ESTUARINE AND NEARSHORE MARINE ENVIRONMENTS. M. P. Lynch, B. L. Laird, N. B. Theberge, and J. C. Jones, eds. 1976. 132 pp.

An evaluation of the impacts of water uses and projected water demands upon the estuarine and nearshore marine environments of the United States. The evaluation includes a regional review of major estuarine and nearshore marine habitats, the economic value of the areas, the major problems impacting water and resources, and the management approach of the States.

FWS/OBS-76/06. EVALUATION OF CHANNELIZATION AND MITIGATION OF THE FISHERY RESOURCES OF THE ST. REGIS RIVER, MONTANA. John A. Lund. 1976. 49 pp.

A study of stream morphology and game fish populations of the St. Regis River, Montana, to determine the effects of stream channelization caused by highway (Interstate 90 and U.S. 10) and railroad construction. Instream structures used to mitigate fish losses are evaluated.

FWS/OBS-76/07. CHANNELIZATION ASSESSMENT, WHITE RIVER, VERMONT: REMOTE SENSING, BENTHOS, AND WILDLIFE. Wendell E. Dodge, Earl E. Possardt, Roger J. Reed, and William P. MacConnell. 1976. 73 pp.

A collection and analysis of data on the amount of different types of fish and wildlife habitats along the White River; the amount and type of habitat altered in the 1973 flood disaster clean-up operation; and the effects of this habitat loss on fish, benthos, songbirds, amphibians, mammals, and reptiles.

FWS/OBS-76/08. EFFECTS OF CHANNELIZATION OF THE LUXAPALILA RIVER ON FISH, AQUATIC INVERTEBRATES, WATER QUALITY, AND FURBEARERS. Dale H. Arner, H. R. Robinette, John E. Frasier, and Marion H. Gray. 1976. 59 pp.

An analysis of biological data collected from an old channelized segment, an unchannelized segment, and a newly channelized segment of the Luxapalila River in Mississippi and Alabama. Productivity of the old channelized segment of the river has not recovered to the levels exhibited in the unchannelized segment.

FWS/OBS-76/09. PROCEEDINGS OF THE NATIONAL WETLAND CLASSIFICATION AND INVENTORY WORKSHOP. J. Henry Sather, ed. 1976. [358] pp.

A review of the current status of wetland work being conducted by various governmental and private agencies. The "Interim Classification of Wetlands and Aquatic Habitats of the United States" is appended to the proceedings and incorporates many suggestions that emanated from the workshop.

FWS/OBS-76/10. A SELECTED ANNOTATED BIBLIOGRAPHY ON FISH AND WILDLIFE IMPLICATIONS OF MISSOURI WATER ALLOCATION. Anita Cochran. 1975. 71 pp.

Contains references useful to those dealing with the management of water allocation within the Upper Missouri River Basin. The subject matter encompasses biological sciences, engineering, geology, law, and the social sciences.

FWS/OBS-76/11. A STUDY OF THE EFFECTS OF STREAM CHANNELIZATION AND BANK STABILIZATION ON WARM WATER SPORT FISH IN IOWA: Subproject No. 1. Inventory of Major Stream Alterations in Iowa. Ross V. Bulkley. 1975. 338 pp.

Aerial photographs and public records were used in this study to determine the amount of channelization of Iowa streams with drainage areas greater than 50 square miles. The extent of channelization was determined by measuring stream sinuosity. It is estimated that from 1,000 to 3,000 miles of streams have been lost in Iowa since settlers first arrived.

FWS/OBS-76/12. A STUDY OF THE EFFECTS OF STREAM CHANNELIZATION AND BANK STABILIZATION ON WARM WATER SPORT FISH IN IOWA: Subproject No. 2. A Study of the Impact of Selected Bank Stabilization Structures on Game Fish and Associated Organisms. Arthur L. Bulkley. 1975. 116 pp.

A study of four types of bank stabilization structures, installed mainly for highway protection, to determine their impact upon game fish habitat in Iowa streams.

FWS/OBS-76/13. A STUDY OF THE EFFECTS OF STREAM CHANNELIZATION AND BANK STABILIZATION ON WARM WATER SPORT FISH IN IOWA: Subproject No. 3. Organisms in Central Iowa Warm Water Streams. Laurence Robert King and Kenneth D. Carlander. 1976. 217 pp.

A study of six central Iowa streams to determine whether fish and fish food organisms were affected by short-reach channelization associated with bridge replacement in the last 15 years.

FWS/OBS-76/14. A STUDY OF THE EFFECTS OF STREAM CHANNELIZATION AND BANK STABILIZATION OF WARM WATER SPORT FISH IN IOWA: Subproject No. 4. The Effects of Long-Reach Channelization on Habitat and Invertebrate Drift in Some Iowa Streams. David William Zimmer and Roger W. Bachmann. 1976. 87 pp.

A study of the relationships between channel morphometry, habitat diversity, and invertebrate density in 11 natural and channelized stream segments of the upper Des Moines River Basin. The most obvious effect of channelization on stream habitat was a reduction in the diversity of water depth and current velocity.

FWS/OBS-76/15. A STUDY OF THE EFFECTS OF STREAM CHANNELIZATION AND BANK STABILIZATION ON WARM WATER SPORT FISH IN IOWA: Subproject No. 5. Effects of Long-Reach Stream Channelization on Distribution and Abundance of Fishes. Bruce W. Menzel and Harland L. Fierstine. 1976. 108 pp.

A study of the relationships between habitat characteristics and the distribution and abundance of fishes in 11 natural and channelized warm-water stream segments of the upper Des Moines River. Species diversity was generally greatest in unchannelized woodland stream segments.

FWS/OBS-76/16. WARM WATER STREAM ALTERATION IN IOWA: Extent, Effects on Habitat Fish and Fish Food, and Evaluation of Stream Improvement Structures (Summary Report). R. V. Bulkley et al. 1976. 39 pp.

A summary of the results in five other subproject reports (FWS/OBS-76/11 to 76/15). Studies were conducted from 1973 to 1976 to determine the extent of stream channelization in Iowa, differences in populations of fish and fish food organisms in channelized and unchannelized streams, effects of stream alterations for highway bridge construction, and the value of stream-bank stabilization structures to fish habitat.

FWS/OBS-76/17. COAL PROJECT: FIVE-YEAR FRAMEWORK (FY 1976 THROUGH FY 1980). 1976. 44 pp.

This report presents the scope of the framework for the Coal Project over the next five years. The project's purpose is to provide the expertise and necessary information to allow for effective involvement of the U.S. Fish and Wildlife Service in national coal development actions.

FWS/OBS-76/18. COAL PROJECT: BACKGROUND INFORMATION (PLANNING AND MANAGEMENT). 1976. 40 pp.

This report presents summary information on coal development in the United States and material on the potential interactions of that development with fish and wildlife resources. Coverage is provided on the recently initiated Federal Coal Leasing Program and a discussion of biogeographic considerations is included.

FWS/OBS-76/19. COAL PROJECT: EXECUTIVE SUMMARY (COAL PROJECT FIVE-YEAR FRAMEWORK. 1976. 8 pp.

An overview of the entire Coal Project written in nontechnical terms.

FWS/OBS-76/20.1 to 76/20.9. A series of summaries on topics related to electric power generation and transmission and their effects on fish and wildlife resources.

FWS/OBS-76/20.1. IMPACTS OF POWER PLANT INTAKE VELOCITIES ON FISH. John Boreman. 1977. 10 pp.

An outline of biological problems associated with power plant intake velocities. This brief includes information needed to assess impacts of intake velocities on fishery resources and a list of technical references containing more detailed analyses of the problems and mitigation alternatives.

FWS/OBS-76/20.2. TRANSMISSION LINE RIGHTS-OF-WAY MANAGEMENT. D. H. Arner. 1977. 12 pp.

A summary of some current transmission line rights-of-way management practices and their costs, the bases for selecting a specific management technique, and some possible management goals to benefit fish and wildlife in various local situations.

FWS/OBS-76/20.3. MATHEMATICAL METHODS TO EVALUATE ENTRAINMENT OF AQUATIC ORGANISMS BY POWER PLANTS. C. Phillip Goodyear. 1977. 17 pp.

This brief contains equations which may be used to estimate the percentage loss of populations of aquatic organisms that are entrained by power plants located on rivers and streams, lakes and reservoirs, and estuaries.

FWS/OBS-76/20.4. Number not used.

FWS/OBS-76/20.5. FEDERAL WATER POLLUTION CONTROL ACT: THE SECTIONS 316(a) AND (b) PROCESS. Eugene S. Fritz. 1978. 13 pp.

Sections 316(a) and (b) of the Federal Water Pollution Control Act deal with thermal (heat) discharges and cooling water intake structures. This publication explains the procedures that must be followed to adhere to these sections.

FWS/OBS-76/20.6. EFFECTS OF GEOTHERMAL ENERGY DEVELOPMENT ON FISH AND WILDLIFE. TOPICAL BRIEFS NO. 6. Glenn W. Suter II. 1978. 20 pp.

This project discusses the nature of geothermal resources, technologies for exploration, extraction, and use; effects of these activities on fish and wildlife; and the potential for habitat enhancement. Emphasis is placed on the range of possible activities and effluents, including comparisons with other energy technologies.

FWS/OBS-76/20.7. FACTORS AFFECTING ACCURACY OF ICHTHYOPLANKTON SAMPLES USED IN POWER PLANT ENTRAINMENT STUDIES. R. R. Bowles, John V. Merriner, and John Boreman. 12 pp.

Sampling programs designed to assess impact of power plants on ichthyoplankton populations are subject to multiple sources of error that may affect reliability and applicability of the data. Gear currently used to sample ichthyoplankton are discussed, and abiotic and biotic factors that may prevent these gear from attaining "representative" samples are identified. A checklist of items which should be considered in evaluation of existing or proposed programs to sample ichthyoplankton is provided.

FWS/OBS-76/20.8. THE CLEAN AIR ACT: ITS RELATION TO FISH AND WILDLIFE RESOURCES. M. Avery and R. K. Schreiber. 1979. 14 pp.

Federal air quality legislation is reviewed, with special emphasis on the 1977 Amendments to the Clean Air Act, particularly those aspects concerning fish and wildlife resources. Participation by fish and wildlife biologists in the implementation of the 1977 Amendments is discussed, and future research needs are identified.

FWS/OBS-76/20.9. COOLING WATER INTAKE SCREENING DEVICES USED TO REDUCE ENTRAINMENT AND IMPINGEMENT. E. S. Fritz. 1980. 21 pp.

Cooling water intake screening devices are identified and described. For each device, the location, limitations or restrictions, evidence for reducing entrainment and impingement, and major unresolved problems are also discussed.

FWS/OBS-76/21. PRELIMINARY REPORT: GRAVEL REMOVAL STUDIES IN SELECTED ARCTIC AND SUBARCTIC STREAMS IN ALASKA. Woodward-Clyde Consultants. 1976. 127 pp.

An evaluation of the effects of gravel removal in streams. Guidelines are included to help resource managers formulate recommendations to minimize environmental impact from operations involving the removal of gravel from streams and floodplains. (See also FWS/OBS-80/08 and 80/09.)

FWS/OBS-76/22. IMPACT OF MOSQUITO CONTROL PRACTICES: A BIBLIOGRAPHY. Gulf South Research Institute. 1977. 97 pp.

An annotated bibliography with sections on insecticide studies and environmental controls.

FWS/OBS-76/23. GREAT LAKES FISH EGG AND LARVAE IDENTIFICATION. John Boreman, ed. 1976. 220 pp.

The proceedings of a workshop held April 19-21, 1976, in Ann Arbor, Michigan, to (1) assess the state-of-the-art of Great Lakes fish egg and larvae identification and (2) develop a strategy for future taxonomic work in the Great Lakes region. Included with the proceedings are an annotated bibliography, a fish species list for each of the Great Lakes, and a list of family characteristics of the fish larvae.

FWS/OBS-76/24. EFFECTS OF STREAM CHANNELIZATION ON FISH POPULATIONS IN THE BUENA VISTA MARSH, PORTAGE COUNTY, WISCONSIN. Michael R. Headrick. 1976. 38 pp.

This study was part of an investigation of channelization impacts on fishery, aquatic invertebrate, and wildlife resources in the central Wisconsin sand plain. Recently dredged ditches were investigated to determine immediate effects; old ditches were investigated to determine how well fish populations had recovered 52-62 years after dredging.

FWS/OBS-76/25. EFFECTS OF STREAM CHANNELIZATION OF TERRESTRIAL WILDLIFE AND THEIR HABITATS IN BUENA VISTA MARSH, WISCONSIN. Dwain M. Prellwitz. 1976. 64 pp.

This study was part of an investigation of channelization impacts on fishery, aquatic invertebrate, and wildlife resources in the central Wisconsin sand plain. Stream channelization affected wildlife in the Buena Vista Marsh by draining wetlands, setting back plant succession and decreasing habitat diversity along stream banks.

FWS/OBS-76/26. Number not used.

FWS/OBS-76/27. WORKSHOP ON ENVIRONMENTAL/ECOLOGICAL MAPPING NEEDS OF THE U.S. FISH AND WILDLIFE SERVICE. 1975. 37 pp.

This summarizes a workshop held 31 August to 2 September 1976 in Monterey, California, to develop internal and external mapping procedures fulfilling the needs of the Fish and Wildlife Service.

FWS/OBS-76/28. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART A: ROCKY MOUNTAINS AND PACIFIC NORTHWEST. Wayne Nelson et al. 1976. 14 pp.

The report FWS/OBS-76/29 is summarized here, and recommendations for improving the process of instream flow reservation and implementation are discussed.

FWS/OBS-76/29 to 76/34. This series of publications deals with flow conditions below 142 dams and diversions in the Rocky Mountains, the Pacific Northwest, and California. Findings, analysis, conclusions, and recommendations are included regarding changed flow regimes below dams, impacts on fisheries, and methodologies used to assess flow requirements.

FWS/OBS-76/29. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART A: ROCKY MOUNTAINS AND PACIFIC NORTHWEST, FINAL REPORT. Wayne Nelson et al. 1976. 120 pp.

FWS/OBS-76/30. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART A: ROCKY MOUNTAIN REGION CASE STUDIES. Wayne Nelson et al. 1976. 373 pp.

FWS/OBS-76/31. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART A: PACIFIC NORTHWEST REGION CASE STUDIES. Wayne Nelson et al. 1976. 398 pp.

FWS/OBS-76/32. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART B: CALIFORNIA, EXECUTIVE SUMMARY. Charles Hazel. 1976. 20 pp.

FWS/OBS-76/33. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART B: CALIFORNIA, FINAL REPORT. Charles Hazel. 1976. 65 pp.

FWS/OBS-76/34. ASSESSMENT OF EFFECTS OF ALTERED STREAM FLOW CHARACTERISTICS ON FISH AND WILDLIFE, PART B: CALIFORNIA CASE STUDIES. Charles Hazel. 1976. 611 pp.

FWS/OBS-76/35. POWER: A COMPUTER SYSTEM FOR CORRIDOR LOCATION. Robert H. Giles, Jr., A. Blair Jones III, and Charles W. Smart. 1976. 30 pp.

Description of a computerized technique for power line corridor selection. Environmental impact is heavily stressed in the system as well as other aspects of corridor location such as maintenance and cost to rate payers.

FWS/OBS-76/36. GEOTHERMAL HANDBOOK. Bill Spaulding. 1976. 194 pp.

This report, intended as a working tool for the field, discusses the basic geologic, physical, and chemical characteristics of geothermal resources; the probable locations of future developments in the West; environmental assessment procedures; and means of wildlife compensation and habitat improvements.

FWS/OBS-76/37. GUIDELINES FOR LINE TRANSECT SAMPLING OF BIOLOGICAL POPULATIONS. David R. Anderson. 1976. 28 pp.

This publication, directed at field biologists and biological technicians, provides guidelines for designing and conducting field surveys to estimate the size or density of biological populations using the line transect sampling method.

FWS/OBS-77/01. IMPROVING FISH AND WILDLIFE BENEFITS IN RANGE MANAGEMENT: PROCEEDINGS OF A SEMINAR HELD IN CONJUNCTION WITH THE 41ST NORTH AMERICAN WILDLIFE AND NATURAL RESOURCE CONFERENCE, MARCH 20, 1976, WASHINGTON, D.C. Joseph E. Townsend and Robert J. Smith, eds. 1977. 118 pp.

An examination of traditional range management practices and the resulting conflicts with wildlife needs. Suggested solutions are given for some specific range management problems. The proceedings consist of papers presented at the seminar, panel discussions, question and answer period transcripts, and conclusions reached by the participants.

FWS/OBS-77/02. NESTING AND MIGRATION AREAS OF BIRDS OF THE U.S. GREAT LAKES. Wm. C. Scharf, M. L. Chamberlain, T. C. Erdman, G. W. Shugart, L. Shanks, and M. Landin. 1979. [360] pp.

This 2-year study evaluated the current status of migratory and colonial-nesting species in the Great Lakes. Population estimates, approximate nesting dates, vegetation associations, and substrates for 207 nesting sites are presented. In addition, 75 migration areas are listed, and their significance to avian populations is discussed.

FWS/OBS-77/03. COASTAL MARSH PRODUCTIVITY: A BIBLIOGRAPHY. Gulf South Research Institute. 1977. 315 pp.

The bibliography consists of 401 references with abstracts covering the productivity of U.S. coastal marshes. Included are sections on the marsh environment, primary productivity of marsh plants, detritus in the food chain, marsh estuaries as fish havens, and the marsh as a habitat and feeding ground.

FWS/OBS-77/04. ENERGY, PUBLIC CHOICES AND ENVIRONMENTAL DATA NEEDS. Frank M. Graves. 1977. 61 pp.

This publication outlines the decisionmaking process of several Federal and State agencies relative to energy developments and fish and wildlife resources in coal and oil shale areas of the West.

FWS/OBS-77/05. GUIDE TO LAND COVER AND USE CLASSIFICATION SYSTEMS EMPLOYED BY WESTERN GOVERNMENTAL AGENCIES. Scott L. Ellis. 1977. 184 pp.

This publication surveys 75 systems presently in use by Federal and State agencies in 16 western States and 2 provinces of Canada. The focus is on systems classifying wildlife, land use, and terrestrial vegetation.

FWS/OBS-77/06. WINTER WATER AVAILABILITY AND USE CONFLICTS AS RELATED TO FISH AND WILDLIFE IN ARCTIC ALASKA: A SYNTHESIS OF INFORMATION. William J. Wilson, Eugene H. Buck, Garry F. Player, and Linda Dwight Dreyer. 1977. 221 pp.

A consolidation of available information related to fish overwintering, wildlife use of unfrozen water during winter, and winter water conditions. This report describes development activities that require water in winter, summarizes existing regulations and agency responsibilities governing water use, and assesses current and future winter water conflicts between man and fish or wildlife.

FWS/OBS-77/07. NESTING COLONIES OF SEABIRDS AND WADING BIRDS: COASTAL LOUISIANA, MISSISSIPPI, AND ALABAMA. John W. Portnoy. 1977. 126 pp.

Nesting colonies along the northern Gulf of Mexico were studied to estimate abundance by species at each colony and to document nesting chronology for each species. This information can be used as a biotic indicator of the stability of the coastal ecosystem.

FWS/OBS-77/08. HERONS AND THEIR ALLIES: ATLAS OF ATLANTIC COAST COLONIES, 1975 and 1976. R. G. Osborn and T. W. Custer. 1978. 211 pp.

Data are presented on 291 heron colonies along the Atlantic Coast from Maine to Florida in 1976 and 1976. Also included are regional and individual maps of colonies, nesting population estimates, and breeding activities by species, and information about the geography, habitats, and human use of each area. These data are from the first comprehensive survey of heron colonies along the Atlantic Coast, and may be valuable in assessing ecological changes in the coastal zones.

FWS/OBS-77/09. THE ECOLOGICAL EFFECTS OF COAL STRIP-MINING: A BIBLIOGRAPHY WITH ABSTRACTS. Sally Ralston et al. 1977. 416 pp.

This bibliography contains annotated entries on the ecological effects of coal strip-mining in the West, especially the Northern Great Plains. Part I contains citations and abstracts. Part II is an extensive "Key Word in Title" index.

FWS/OBS-77/10. DIRECTORY OF EXISTING NATURAL RESOURCE AGENCY MANUALS AND HANDBOOKS. Thorne Ecological Institute. 1977. 61 pp.

Superseded by FWS/OBS-78/22.

FWS/OBS-77/11. PUBLICATIONS OF THE BIOLOGICAL SERVICES PROGRAM. 1977.

Outdated, no longer available.

FWS/OBS-77/12 to 77/15. This series of reports was developed to assist FWS personnel in evaluating the impacts of offshore oil and gas activities on coastal resources.

FWS/OBS-77/12. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME I, RECOVERY TECHNOLOGY. John Clark, Jeffrey Zinn, and Charles Terrell. 1978. 226 pp.

Reviews oil and gas resources on the national scale, describes the recovery process and the major activities and facilities related to OCS operations.

FWS/OBS-77/13. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME II, EFFECTS ON COASTAL COMMUNITIES. Jeffrey Zinn. 1978. 60 pp.

Discusses the economic and environmental effects of the growth of coastal communities.

FWS/OBS-77/14. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME III, EFFECTS ON LIVING RESOURCES AND HABITATS. John Clark and Charles Terrell. 1978. 220 pp.

Provides a comprehensive review of sources of ecological disturbance from OCS-related primary and secondary development.

FWS/OBS-77/15. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME IV, REGULATORY FRAMEWORK FOR PROTECTING LIVING RESOURCES. John S. Banta. 1978. 126 pp.

An analysis of the regulatory framework related to OCS activities and describes the laws and policy-controlling inshore and onshore support activities.

FWS/OBS-77/16.1 to 77/16.5. This series of five reports focusses on current and anticipated OCS development in each of five coastal regions of the United States: New England; Mid and South Atlantic; Gulf; California; and Alaska, Washington, and Oregon.

FWS/OBS-77/16.1. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME V, REGIONAL STATUS REPORTS, PART 1, NEW ENGLAND. Virginia Tippie and Don Robadue. 1978. 67 pp.

FWS/OBS-77/16.2. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME V, REGIONAL STATUS REPORTS, PART 2, MID AND SOUTH ATLANTIC. Joel Goodman. 1978. 93 pp.

FWS/OBS-77/16.3. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME V, REGIONAL STATUS REPORTS, PART 3, GULF COAST. Anthony J. Mumphrey and Gino D. Garlucci. 1978. 158 pp.

FWS/OBS-77/16.4. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME V, REGIONAL STATUS REPORTS, PART 4, CALIFORNIA. Ruthann Corwin and Patrick H. Heffernan. 1978. 154 pp.

FWS/OBS-77/16.5. ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS: VOLUME V, REGIONAL STATUS REPORTS, PART 5, ALASKA, WASHINGTON, AND OREGON. Marc J. Hershman and James H. Feldman. 1978. 127 pp.

FWS/OBS-77/17. Number not used.

FWS/OBS-77/18. Number not used.

FWS/OBS-77/19. GUIDELINES FOR PREPARING EXPERT TESTIMONY IN WATER MANAGEMENT DECISIONS RELATED TO INSTREAM FLOW ISSUES. IFIP No. 1. Berton Lee Lamb. 1977. 42 pp.

Superseded by FWS/OBS-79/37.

FWS/OBS-77/20. AN ENVIRONMENTAL GUIDE TO WESTERN SURFACE MINING, PART I: FEDERAL LEASABLE AND LOCATABLE MINERAL REGULATIONS. Russell Moore. 1977. 67 pp.

Contains a compilation of all Federal environmental regulations, as of 15 March 1977, pertaining to Western surface mining. Minerals covered by this study include coal, oil shale, copper, uranium, bentonite, phosphate, and gypsum. (Part II is FWS/OBS-78/04.)

FWS/OBS-77/21. USER NEEDS ASSESSMENT FOR AN OPERATIONAL GEOGRAPHIC INFORMATION SYSTEM. Larry Salmen et al. 1977. 89 pp.

This publication presents the results of a 5-month survey of user needs for a geographic information system. The assessment focuses on three groups of users: Denver Region 6 FWS Offices; Region 6 Billings Area Office; and Special Projects of OBS.

FWS/OBS-77/22. A GENERAL DESIGN SCHEMA FOR AN OPERATIONAL GEOGRAPHIC INFORMATION SYSTEM. Larry Salmen et al. 1977. 49 pp.

This report presents a general system design and outlines a basic set of system capabilities for the FWS's geographic information system.

FWS/OBS-77/23. BALANCING NATIONAL ENERGY NEEDS WITH ECOLOGICAL REQUIREMENTS: EASTERN ENERGY AND LAND USE TASK FORCE REPORT, EXECUTIVE SUMMARY. 1977. 34 pp.

A summary of the findings to date of the Eastern Energy and Land Use Task Force formed in October 1975. The Task Force has analyzed on-going and anticipated energy and mineral developments in the eastern United States to determine the impact on fish, wildlife, and their habitat and recommended solutions.

FWS/OBS-77/24. PROCEEDINGS OF THE 1977 OIL SPILL RESPONSE WORKSHOP. Paul L. Fore, ed. 1977. 153 pp.

A collection of papers presented at the oil spill response workshop held in New Orleans, February 15-17, 1977. The workshop was co-sponsored by the Office of Migratory Bird Management and was designed to improve the Service's capability and effectiveness in responding to oil spills. Includes techniques for minimizing the biological impacts of oil on wildlife and a critique of the FWS oil spill contingency plan.

FWS/OBS-77/25. FISH AND FISH FOOD ORGANISMS IN VARIOUS HABITATS OF THE MISSOURI RIVER IN SOUTH DAKOTA, NEBRASKA, AND IOWA. Larry W. Kallemeyn and Jerry F. Novotny. 1977. 100 pp.

This study was undertaken to assess the ecological value of various river habitats and to serve as a guide for engineering planners. Data were collected in the upper end of the channelized Missouri River to evaluate ecological effects of notching dikes and revetments. The report relates habitat characteristics to fish species, sizes and abundances, and to kinds and abundance of fish food.

FWS/OBS-77/26. STRATEGIES FOR RESERVING FLOWS FOR FISH AND WILDLIFE: IDENTIFICATION, DESCRIPTION, AND PRELIMINARY EVALUATION. Richard L. Dewsnup et al. 1977. 706 pp.

This report contains an extensive overview of Federal laws, State laws, water quality laws, and interstate compacts as they relate to the provision of instream flows for fish and wildlife purposes.

FWS/OBS-77/27. STATE LAWS AND INSTREAM FLOWS. Richard L. Dewsnup et al. 1977. 76 pp.

This publication examines water laws regarding instream flow reservations for 13 western States. The report also identifies strategies available for reserving flows and presents in a matrix form the legal foundation for each strategy on a State-by-State basis.

FWS/OBS-77/28. WESTERN INTERSTATE WATER COMPACTS AND INSTREAM FLOWS. Richard L. Dewsnup and Dallin W. Jensen. 1977. v.p.

Each of the interstate compacts regarding water allocation in the western States are identified and described in terms of their provisions, both general and for reserving flows for fish and wildlife.

FWS/OBS-77/29. PROMISING STRATEGIES FOR RESERVING INSTREAM FLOWS. Richard L. Dewsnup et al. 1977. 78 pp.

Summarizes the more important State and Federal water law concepts as they relate to reserving instream flows for fish and wildlife. More than 30 strategies for reserving instream flows within existing laws are described.

FWS/OBS-77/30. HABITAT AND POPULATION IMPROVEMENT MEASURES ACCOMPANYING WATER RESOURCE DEVELOPMENT PROJECTS. Wayne Nelson et al. 1977. 39 pp.

This publication describes successful and potentially successful habitat and population improvement measures accompanying water resource development projects, especially dams and reservoirs in the West.

FWS/OBS-77/31 to 77/35. These bibliographies contain abstracts of literature pertaining to the flora, fauna, and physical characteristics of the WELUT Ecological Test Areas in Wyoming, Montana, North Dakota, New Mexico, Utah, and Colorado.

FWS/OBS-77/31. ANNOTATED BIBLIOGRAPHY OF NATURAL RESOURCE INFORMATION: POWDER RIVER BASIN, NORTHEASTERN WYOMING/SOUTHEASTERN MONTANA. Ecology Consultants, Inc. 1977. 234 pp.

FWS/OBS-77/32. ANNOTATED BIBLIOGRAPHY OF NATURAL RESOURCE INFORMATION: SOUTHWESTERN NORTH DAKOTA. Ecology Consultants, Inc. 1977. 234 pp.

FWS/OBS-77/33. ANNOTATED BIBLIOGRAPHY OF NATURAL RESOURCE INFORMATION: NORTHWESTERN NEW MEXICO. Ecology Consultants, Inc. 1977. 150 pp.

FWS/OBS-77/34. ANNOTATED BIBLIOGRAPHY OF NATURAL RESOURCE INFORMATION: SOUTHERN UTAH. Ecology Consultants, Inc. 1977. 265 pp.

FWS/OBS-77/35. ANNOTATED BIBLIOGRAPHY OF NATURAL RESOURCE INFORMATION: NORTHWESTERN COLORADO. Ecology Consultants, Inc. 1977. 194 pp.

FWS/OBS-77/36. COOPERATIVE INSTREAM FLOW SERVICE GROUP: THE FIRST YEAR. 1977. 8 pp.

The personnel, goals, and activities of the multiagency, multidiscipline Cooperative Instream Flow Service Group are described.

FWS/OBS-77/37. CONTRIBUTED PAPERS ON COASTAL ECOLOGICAL CHARACTERIZATION STUDIES. J. B. Johnson and L. A. Barclay, eds. Fourth Biennial International Estuarine Research Conference, Mt. Pocono, PA, October 2-5, 1977. Published June 1978. Available from NTIS. Also available from NCET.

FWS/OBS-77/38 to 77/41. These four publications pertain to the Plant Information Network (PIN). See also FWS/OBS-83/36.

FWS/OBS-77/38. THE PLANT INFORMATION NETWORK: VOLUME I, A USER'S GUIDE. Kimery C. Vories et al. 1977. 73 pp.

This handbook describes the basic philosophy of the Plant Information Network, its organization, the descriptors included, and definitions used for descriptors. Basic language used to query the database are also included.

FWS/OBS-77/39. THE PLANT INFORMATION NETWORK: VOLUME II, RECLAMATION AND PIN IN NORTHWESTERN COLORADO. Kimery Vories et al. 1977. 62 pp.

This publication is a guide to the use of PIN for information on environmental inventory, endangered plant status, and reclamation. Sample queries are included.

FWS/OBS-77/40. THE PLANT INFORMATION NETWORK: VOLUME III, RECLAMATION AND PIN IN THE POWDER RIVER BASIN OF MONTANA AND WYOMING. Kimery Vories et al. 1977. 59 pp.

This publication is a guide to the use of PIN for information on environmental inventory, endangered plant status, and reclamation. Sample queries are included.

FWS/OBS-77/41. THE PLANT INFORMATION NETWORK: VOLUME IV, A SUBJECT GUIDE AND ANNOTATED BIBLIOGRAPHY OF SELECTED LITERATURE ON LAND RECLAMATION IN WESTERN UNITED STATES. Kimery Vories et al. 1977. 75 pp.

This publication presents a subject guide and annotated bibliography of selected publications pertaining to land reclamation and rehabilitation in the West.

FWS/OBS-77/42. TACTICAL APPROACH FOR DETERMINING IMPACT OF ENERGY DEVELOPMENT ON WILDLIFE IN WYOMING (SPECIAL REPORT NUMBER 1). Kent D. Keenlyne. 1977. 16 pp.

This report explains the tactical duties of the Wyoming Coal Coordinator and the rationale to be followed in performing these duties. Includes a discussion on assessing impacts on wildlife and an outline for a series of reports from the Coal Coordinator summarizing existing information and identifying potential problem areas.

FWS/OBS-77/43. COAL (SPECIAL REPORT NUMBER 2). Kent D. Keenlyne. 1977. 40 pp.

Identifies possible areas of concern for wildlife and its habitat in Wyoming with the development of coal resources and associated land use changes. Summarizes past and present development of coal resources in Wyoming in anticipation of future data needs for making resource decisions in coal development.

FWS/OBS-77/44. ENDANGERED OR THREATENED SPECIES IN WYOMING (SPECIAL REPORT NUMBER 3). Kent D. Keenlyne. 1977. 48 pp.

An overview of the potential impact of energy development in Wyoming on Federally listed "endangered" and "threatened" species. Identifies areas where biological information necessary to assess the effects of future development may be inadequate or lacking.

FWS/OBS-77/45. Number not used.

FWS/OBS-77/46. SOME EFFECTS OF STREAM CHANNELIZATION ON FISH POPULATIONS, MACROINVERTEBRATES, AND FISHING IN OHIO AND INDIANA. Bernard L. Griswold, Clayton Edwards, Lewis Woods, and Earl Weber. 1978. 64 pp.

The effects of stream channelization were studied in five streams by comparing the biota in natural areas to that in nearby channelized areas. Study streams were the Olentangy, Sandusky, Hocking, and Little Auglaize Rivers in Ohio, and Rock Creek in northeast Indiana. An additional channelized study site which had large artificial riffle-pool stream improvement structures was studied in the Olentangy.

FWS/OBS-77/47. PROTECTING INSTREAM FLOWS UNDER WESTERN WATER LAWS: SELECTED PAPERS. IFIP No. 2. Berton Lee Lamb. 1977. 65 pp.

This publication contains papers submitted to a 1977 panel, "Protection of Instream Flow Under Western Water Law." A matrix of strategies for protecting instream flows under existing water law is included.

FWS/OBS-77/48. INTERIM HIERARCHICAL REGIONAL CLASSIFICATION SCHEME FOR COASTAL ECOSYSTEMS OF THE UNITED STATES AND ITS TERRITORIES. Terry T. Terrell. 1977. 40 pp.

This is a review of the literature on coastal ecosystem classifications. A hierarchical classification scheme is presented to be used in predicting the impact of various perturbations on coastal ecosystems. Superseded by FWS/OBS-78/80.

FWS/OBS-77/49. UNOBLIGATED AND UNUTILIZED RESERVOIR STORAGE AT FEDERALLY CONTROLLED DAMS. Wayne Nelson et al. 1976. 59 pp.

This report identifies the status and amounts of unobligated and unutilized storage space in operating Federal reservoirs in the West. It also identifies legislative and administrative means for making these supplies of stored water available for fish and wildlife purposes.

FWS/OBS-77/50. BIOLOGICAL SERVICES PROGRAM, FISCAL YEAR 1976. 1977. 90 pp.

Overview of the organization and 1976 fiscal year activities of the Biological Services Program of the Fish and Wildlife Service.

FWS/OBS-77/51. BIOLOGICAL IMPACTS OF MINOR SHORELINE STRUCTURES ON THE COASTAL ENVIRONMENT: STATE OF THE ART REVIEW. E. L. Mulvihill, C. A. Francisco, J. B. Glad, K. B. Kaster, and R. E. Wilson. 1980. Vol. I, 156 pp. Vol. II, 306 pp.

This review summarizes and evaluates the information found in the literature for minor shoreline structures: breakwaters, jetties, groynes, bulkheads, revetments, ramps, piers and other support structures, buoys and floating platforms, harbors for small craft, bridges, and causeways. The information is intended for fish and wildlife biologists who review permits for the construction of minor shoreline structures in the coastal environment. Volume II contains an annotated bibliography, keyword index, and primary author reference number index.

FWS/OBS-77/52. ENVIRONMENTAL EFFECTS OF ENERGY. Oak Ridge Associated Universities. 1976. 31 pp.

This report contains the proceedings of a conference convened to review two segments of an EPA pass-through program: ecological effects and environmental transport processes. The purpose was to characterize ecological effects, the program's relationship to energy development, gaps in information, and relevance to management.

FWS/OBS-77/53. Number not used.

FWS/OBS-77/54. COMPARISON OF SELECTED OPERATIONAL CAPABILITIES OF FIFTY-FOUR GEOGRAPHIC INFORMATION SYSTEMS. Larry Salmen et al. 1977. 30 pp.

This report presents an overview of 54 geographic information systems and their ability to meet the needs of Fish and Wildlife, Region 6, for a computer-based goegraphic information system. An appendix outlining functional criteria for software evaluation is included.

FWS/OBS-77/55. NATURAL RESOURCE GEOGRAPHIC DATA BASES FOR MONTANA AND WYOMING. Larry Salmen et al. 1977. 70 pp.

This report is the result of a survey of existing data bases for potential use by the FWS Region 6. Data bases surveyed consist mainly of spatially-oriented data that would be useful in a geographic information system for Montana and Wyoming.

FWS/OBS-77/56. BARRIER ISLANDS OF THE ATLANTIC AND GULF COASTS OF THE UNITED STATES: AN ANNOTATED BIBLIOGRAPHY. Gulf South Research Institute. 1978. 215 pp.

Selected publications on the living resources for fish and wildlife habitats of the Barrier Islands of the Atlantic and Gulf Coasts. Includes subject and author indexes.

FWS/OBS-77/57. AN ECOSYSTEM PARADIGM FOR ECOLOGY. Philip L. Johnson, ed. 1977. 20 pp.

The results of a workshop organized by Oak Ridge Associated Universities and The Institute of Ecology. Collective views of the participants are presented on the nature of ecosystem ecology as a science. The workshop was supported by the Rockefeller Foundation and the Office of Biological Services, U.S. Fish and Wildlife Service.

FWS/OBS-77/58 to 77/60, 78/87 to 78/89, 78/93, 78/94. The series Impact of Water Level Changes on Woody Riparian and Wetland Communities provides a current summary of available information concerning the effect of water level imposed stress on a wide range of woody plants. The series is divided into volumes separating regions by dominant forest types. This is intended to facilitate usage on the regional or local level. The first volume describes physiological, morphological, and community changes which occur as a result of inundation of wetland ecosystems. Other volumes in the series provide a summary of regional wetland ecosystems, dominant and associated species types and a review of individual species tolerance to inundation.

FWS/OBS-77/58. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME I: PLANT AND SOIL RESPONSES. Robert O. Teskey and Thomas M. Hinckley. 1977. 30 pp.

FWS/OBS-77/59. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME III: THE SOUTHERN FOREST REGION. Robert O. Teskey and Thomas M. Hinckley. 1977. 46 pp.

FWS/OBS-77/60. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME III: THE CENTRAL FOREST REGION. Robert O. Teskey and Thomas M. Hinckley. 1977. 36 pp.

FWS/OBS-77/61. AN INDEXED, ANNOTATED BIBLIOGRAPHY OF THE ENDANGERED AND THREATENED FISHES OF THE UPPER COLORADO RIVER SYSTEM. Timothy Joseph et al. 1977. 169 pp.

This bibliography emphasizes the limiting factors, habitat alteration, and numerous environmental characteristics associated with the endangered and threatened fishes of the Upper Colorado River system. Subject, geographic, and systematic indexes are included.

FWS/OBS-77/62. AN EVALUATION OF THE STATUS, LIFE HISTORY, AND HABITAT REQUIREMENTS OF ENDANGERED AND THREATENED FISHES OF THE UPPER COLORADO RIVER SYSTEM. Timothy Joseph and James A. Sinning.

This report focuses on endangered and threatened fishes and their ecosystems. The major sections of the report are abiotic components, biological components, species description, river basin description, major factors inducing environmental change, and recommended research priorities.

FWS/OBS-77/63. DEVELOPMENT AND EVALUATION OF WEIGHTED CRITERIA, PROBABILITY-OF-USE CURVES FOR INSTREAM FLOW ASSESSMENT: FISHERIES. IFIP No. 3. Ken D. Bovee et al. 1977. 53 pp.

This report describes methods and procedures for probability criteria curves. Weighted criteria are used to assess impacts of altered streamflow regimes on a stream habitat, using parameters of depth, velocity, substrate, and temperature. Guidelines for data collection, analysis, and curve development are discussed.

FWS/OBS-77/64. WADING BIRDS AS BIOLOGICAL INDICATORS: 1975 COLONY SURVEY. Thomas W. Custer and Ronald G. Osborn. Special Scientific Report - Wildlife No. 206. 1977. 28 pp.

Study of suitability of wading birds (herons and their allies) as biological indicators in the coastal environment. Eight teams of investigators located and censused 198 colonies along the Atlantic coast from Maine to Florida. Fourteen species, including over one-quarter million breeding birds, were censused.

FWS/OBS-77/65. HABITAT REQUIREMENTS OF JUVENILE COLORADO RIVER SQUAWFISH.

This study determines the habitat requirements of several rare fishes, primarily young Colorado squawfish. The objectives of the study were to determine the physical and chemical parameters of the fish habitats, determine where spawning occurs, determine movements of size classes of rare fishes, determine the fish species associated with the study area and assess the relative importance of various river habitats.

FWS/OBS-77/66. PLANNING FOR WILDLIFE IN CITIES AND SUBURBS. Daniel L. Leedy, Robert M. Maestro, and Thomas M. Franklin. 1978. 64 pp.

A manual which identifies and relates principles of wildlife and urban planning. Suggestions are made for improving cooperation among planners, developers, and biologists. The study was co-sponsored by the American Society of Planning Officials, Chicago, Illinois.

FWS/OBS-78/01. A GUIDE TO MATHEMATICAL MODELS USED IN STEAM ELECTRIC POWER PLANT ENVIRONMENTAL IMPACT ASSESSMENT. Sanford G. Bloom, Barney W. Cornaby, and William E. Martin. 1978. 153 pp.

The guide provides a nontechnical overview of modeling approaches for predicting and assessing environmental impacts of steam electric power plant operation on fish and wildlife resources.

FWS/OBS-78/02. THE PLANT INFORMATION NETWORK BROCHURE. 1978. 2 p.

This brochure describes the organization, philosophy, and statement of need for the Plant Information Network (PIN). A list of PIN descriptors and descriptor states and examples of the use of PIN are included.

FWS/OBS-78/03. Number not used.

FWS/OBS-78/04. AN ENVIRONMENTAL GUIDE TO WESTERN SURFACE MINING. PART TWO: IMPACTS, MITIGATION, AND MONITORING. Russell Moore and Thomas Mills. 1977. 384 p.

This guide assembles information about the effects of surface mining in the Northern Great Plains, the Rocky Mountains, and the Southwest on fish and wildlife and recommends ways to mitigate these effects. (Part one is FWS/OBS-77/20.)

FWS/OBS-78/05. Number not used

FWS/OBS-78/06. Number not used.

FWS/OBS-78/07. PROBABILITY OF USE CRITERIA FOR THE FAMILY SALMONIDAE. IFIP NO. 4. Ken D. Bovee. 1978. 90 pp.

This report gives the probability of use criteria for the hydraulic parameters of depth, velocity, substrate, and temperature for the family Salmonidae.

FWS/OBS-78/08. THE CHENIER PLAIN ECOLOGICAL CHARACTERIZATION. 1979. Brochure.

A brochure describing "An Ecological Characterization Study of the Chenier Plain Ecosystem of Louisiana and Texas" (FWS/OBS-78/09 to 78/11). Summarizes habitats and human activities of this region.

FWS/OBS-78/09 to 78/11. This 3-volume series is a compilation of existing information about the biological, physical, and social characteristics of the Chenier Plain of Louisiana and Texas. The information is intended for use in coastal planning and management.

FWS/OBS-78/09. AN ECOLOGICAL CHARACTERIZATION STUDY OF THE CHENIER PLAIN COASTAL ECOSYSTEM OF LOUISIANA AND TEXAS: VOLUME I, NARRATIVE REPORT. James G. Gosselink, Carroll L. Cordes, and John W. Parsons. 1979. 325 pp.

FWS/OBS-78/10. AN ECOLOGICAL CHARACTERIZATION STUDY OF THE CHENIER PLAIN COASTAL ECOSYSTEM OF LOUISIANA AND TEXAS: VOLUME II, APPENDICES. James G. Gosselink, Carroll L. Cordes, and John W. Parsons. 1979. 419 pp.

FWS/OBS-78/11. AN ECOLOGICAL CHARACTERIZATION STUDY OF THE CHENIER PLAIN COASTAL ECOSYSTEM OF LOUISIANA AND TEXAS: VOLUME III, ATLAS. James G. Gosselink, Carroll L. Cordes, and John W. Parsons. 1979. 11 maps. No longer available.

FWS/OBS-78/12. DEVELOPMENT OF FISHES OF THE MID-ATLANTIC BIGHT: AN ATLAS OF EGG, LARVAL, AND JUVENILE STAGES. Philip W. Jones et al. 1978.

VOLUME I: ACIPENSERIDAE THROUGH ICTALURIDAE. 366 pp.
VOLUME II: ANGUILLIADE THROUGH SYNGNATHIDAE. 458 pp.
VOLUME III: APHREDODERIDAE THROUGH RACHYCENTRIDAE. 394 pp.
VOLUME IV: CARANGIDAE THROUGH EPHIPPIDAE. 314 pp.
VOLUME V: CHAETODONTIDAE THROUGH OPHIDIIDAE. 340 pp.
VOLUME VI: STROMATEIDAE THROUGH OGCOCEPHALIDAE. 416 pp.

A six-volume series of reference books which compiles descriptions of the egg, larval, and juvenile stages of over 300 fish species, and includes dichotomous keys useful for identifying species. Descriptions of spawning migrations and life habits of adult fishes, their geographic range and distribution, and movements of fish at all life stages are also included. The text for each species is accompanied with selected illustrations of the various life history stages from world-wide literature. Each volume ends with a single bibliography for all the species included.

FWS/OBS-78/13. AN INDEXED ANNOTATED BIBLIOGRAPHY OF THE RARE FISHES OF THE UPPER MISSOURI RIVER SYSTEM. Timothy Joseph. 1977. 282 pp.

This bibliography is Part One of a two-part study of the status, life history, and habitat requirements of rare fishes with restricted distributions in the Upper Missouri River system. Part Two is presented in FWS/OBS-78/32.

FWS/OBS-78/14. THE POTENTIAL EFFECTS OF CLEARING AND SNAGGING ON STREAM ECOSYSTEMS. G. Richard Marzolf. 1978. 31 pp.

This report contains a literature review of stream ecology and assessments of some of the ecological impacts of clearing and snagging. It describes parameters for quantitatively evaluating the ecological effects of specific clearing and snagging projects.

FWS/OBS-78/15. COLONIAL BIRDS NESTING ON MAN-MADE AND NATURAL SITES IN THE U.S. GREAT LAKES. William C. Scharf. 1978. 189 pp. Not available.

Habitats and nesting populations of colonial nesting birds of the U.S. Great Lakes were determined by aerial census, ground nest observations, and vegetation analysis during 1976 and 1977. Thirteen species at 267 colonies were found during this 2-year study. An atlas of nesting sites and populations for both years of the study locates and gives the sizes of the colonies.

FWS/OBS-78/16. STREAM CHANNEL MODIFICATION IN HAWAII. PART A: STATEWIDE INVENTORY OF STREAMS, HABITAT FACTORS AND ASSOCIATED BIOTA. Amadeo S. Timbol and John A. Macioleu. 1978. 171 pp.

A statewide, exhaustive inventory of perennial streams with channel modifications, including a general survey of habitat factors and macrofauna (fish and decapod crustaceans).

FWS/OBS-78/17. STREAM CHANNEL MODIFICATION IN HAWAII. PART B: EFFECT OF CHANNELIZATION ON THE DISTRIBUTION AND ABUNDANCE OF FAUNA IN SELECTED STREAMS. A. S. Norton, Amadeo S. Timbol, and James D. Parrish. 1978. 47 pp.

Effects of channelization on native Hawaiian stream fauna were assessed by making physiochemical measurements and analyzing and comparing macrofaunal communities (fish and crustaceans) in channelized and unchannelized streams. Results of this study are relevant to many tropical oceanic high islands.

FWS/OBS-78/18. STREAM CHANNEL MODIFICATION IN HAWAII. PART C: TOLERANCE OF NATIVE STREAM SPECIES TO OBSERVED LEVELS OF ENVIRONMENTAL VARIABILITY. Charles B. Hathaway, Jr. 1978. 59 pp.

Provides a detailed description of stream conditions that are important to native species, and how channelization affects those conditions. It also reports levels of tolerance of several native species to altered stream characteristics.

FWS/OBS-78/19. STREAM CHANNEL MODIFICATION IN HAWAII. PART D: SUMMARY REPORT. James D. Parrish et al. 1978. 18 pp.

A general summary of a 3-year statewide study of the occurrence and consequences of channelization in Hawaiian streams. An inventory of 366 perennial streams included information on physical characteristics, complete status of channel alteration, and macrofaunal communities. Recommendations for mitigating the impact of channel modification are included.

FWS/OBS-78/20. ATLAS OF WESTERN SURFACE-MINED LANDS: COAL, URANIUM AND PHOSPHATE. Kent Evans et al. 1978. 373 pp.

This is a compilation of information on mines in 11 contiguous western States which were operating prior to 1976 and are more than 10 acres. Location, owner/operator, mining plans and methodology, reclamation plans, dates of operation, and current land conditions are included.

FWS/OBS-78/21. A SYSTEMS APPROACH TO ECOLOGICAL BASELINE STUDIES. James B. States et al. 1978. 400 pp.

This handbook is intended to help baseline study project managers and their technical staffs analyze ecosystems threatened by impacts and requiring baseline studies for environmental impact statements, post-impact monitoring programs, and reclamation plans.

FWS/OBS-78/22. BIBLIOGRAPHY OF MANUALS AND HANDBOOKS FROM NATURAL RESOURCE AGENCIES. Hubert D. Burke. 1978. 79 pp.

This bibliography supersedes FWS/OBS-77/10. It lists handbooks and manuals relating to wildlife (produced by State and Federal agencies) which are not found in libraries or information retrieval systems. The revised edition includes an agency and subject index, in addition to an expanded introductory chapter.

FWS/OBS-78/23. STREAM CLASSIFICATION 1977: PROCEEDINGS OF A WORKSHOP HELD AT PINGREE PARK, COLORADO, OCTOBER 10-13, 1977. William G. McConnell et al. 1978. 70 pp.

This workshop was designed to provide an outline for the accurate development of useful stream classifications. The three major points considered were the purposes of classification, the principles necessary to ensure the usefulness of a classification, and the processes of developing and sequencing components in a useful classification.

FWS/OBS-78/24. Number not used.

FWS/OBS-78/25. RESERVOIR ECOSYSTEMS AND WESTERN COAL DEVELOPMENT IN THE UPPER MISSOURI RIVER: A SUMMARY REPORT. William R. Nelson et al. 1978. 12 pp.

This report provides an overview of a one-year FWS study which evaluated the limnology, water chemistry, and fisheries of Lake Fort Peck in Montana and Lake Sakakawea in North Dakota. Descriptions of their baseline conditions, impacts of coal developments, mitigation measures, and further research needs are described.

FWS/OBS-78/26. TEXAS LIGNITE: ENVIRONMENTAL PLANNING OPPORTUNITIES. Thomas Cloud. 1978. 12 pp.

This report discusses the impacts of Texas lignite development on aquatic and terrestrial environments and recreation. Various opportunities for environmental protection measures, such as involving concerned agencies and the public in planning and the establishment of reclamation plans are also discussed.

FWS/OBS-78/27. Number not used.

FWS/OBS-78/28. Number not used.

FWS/OBS-78/29. IMPACTS OF COAL-FIRED POWER PLANTS ON FISH, WILDLIFE, AND THEIR HABITATS. A. J. Dvorak et al. 1978. 261 pp.

This report contains an assessment of expected impacts to terrestrial and aquatic biota and their habitats that are associated with the operation of coal-fired power stations, from the point at which coal is delivered to the site through disposal of process wastes. Emphasis is placed on discussion of impacts unique to coal combustion, although some features of gas- and oil-fired stations are also addressed. Impacts arising from thermal effluents, condenser cooling facilities, and power transmission are not discussed.

FWS/OBS-78/30. METHODS FOR THE ASSESSMENT AND PREDICTION OF MINERAL MINING IMPACTS ON AQUATIC COMMUNITIES: A REVIEW AND ANALYSIS. WORKSHOP PROCEEDINGS. William T. Mason, Jr., ed. 1978. 157 pp.

State-of-the-art overviews on methods for the collection and analysis of aquatic biological samples and on interpretive data techniques. Recommendations are given on the advantages and disadvantages of selected methods. Discussions on the status of predictive techniques for assessment of potential mineral development impacts to aquatic communities are presented.

FWS/OBS-78/31. RARE AND ENDANGERED VERTEBRATES OF THE SOUTHEASTERN U.S. COASTAL PLAIN - A SUMMARY OF PUBLIC CONCERN FOR SENSITIVE WILDLIFE. Steven P. Christman and Wallace S. Lippincott, Jr. 1978. 46 pp.

Includes a table presenting species cited as endangered or threatened in the southeastern U.S., including which species are protected in which areas, and which species are being proposed for protection.

FWS/OBS-78/32. CAPTURE LOCATIONS OF RARE FISH IN THE UPPER COLORADO RIVER SYSTEM. Ecology Consultants, Inc. 1978. 50 pp.

This is Part Two of a study (Part One is FWS/OBS-78/13) and provides information on the distribution of rare fish species in the Upper Colorado River system. Capture locations are plotted for Colorado, Utah, Wyoming, and New Mexico.

FWS/OBS-78/33. HYDRAULIC SIMULATION IN INSTREAM FLOW STUDIES: THEORY AND TECHNIQUES. IFIP NO. 5. Robert R. Milhous et al. 1978. 143 pp.

Several types of techniques for the prediction of the stage-discharge relationship and the velocity distribution-discharge relationship are presented, along with general limitations and site-imposed constraints pertaining to each type of simulation technique.

FWS/OBS-78/34. METHODS OF ASSESSING INSTREAM FLOWS FOR RECREATION. IFIP NO. 6. Ronald Hyra. 1978. 52 pp.

This paper describes two techniques for performing recreational instream flow studies. The single cross section method is discussed briefly. The majority of the paper deals with the more sophisticated incremental method of assessing instream flows. Stream flow suitability criteria for recreation are presented for both methods.

FWS/OBS-78/35 to 78/47. Each of the 12 reports in this series focuses on identifying and evaluating the most promising methods for reserving instream flows to benefit fish and wildlife in a particular western State.

FWS/OBS-78/35. INSTREAM FLOW STRATEGIES FOR ARIZONA. Wayne Nelson et al. 1978. 100 pp.

FWS/OBS-78/36. INSTREAM FLOW STRATEGIES FOR CALIFORNIA. Wayne Nelson et al. 1978. 106 pp.

FWS/OBS-78/37. INSTREAM FLOW STRATEGIES FOR COLORADO. Wayne Nelson et al. 1978. 101 pp.

FWS/OBS-78/38. INSTREAM FLOW STRATEGIES FOR IDAHO. Wayne Nelson et al. 1978. 107 pp.

FWS/OBS-78/39. INSTREAM FLOW STRATEGIES FOR MONTANA. Wayne Nelson et al. 1978. 112 pp.

FWS/OBS-78/40. INSTREAM FLOW STRATEGIES FOR NEVADA. Wayne Nelson et al. 1978. 100 pp.

FWS/OBS-78/41. INSTREAM FLOW STRATEGIES FOR NEW MEXICO. Wayne Nelson et al. 1978. 94 pp.

FWS/OBS-78/42. INSTREAM FLOW STRATEGIES FOR NORTH DAKOTA. Wayne Nelson et al. 1978. 109 pp.

FWS/OBS-78/43. INSTREAM FLOW STRATEGIES FOR OREGON. Wayne Nelson et al. 1978. 124 pp.

FWS/OBS-78/44. INSTREAM FLOW STRATEGIES FOR SOUTH DAKOTA. Wayne Nelson et al. 1978. 107 pp.

FWS/OBS-78/45. INSTREAM FLOW STRATEGIES FOR UTAH. Wayne Nelson et al. 1978. 99 pp.

FWS/OBS-78/46. INSTREAM FLOW STRATEGIES FOR WASHINGTON. Wayne Nelson et al. 1978. 120 pp.

FWS/OBS-78/47. INSTREAM FLOW STRATEGIES FOR WYOMING. Wayne Nelson et al. 1978. 97 pp.

FWS/OBS-78/48. IMPACTS OF TRANSMISSION LINES ON BIRDS IN FLIGHT. Michael L. Avery, ed. 1978. 151 pp.

Contains the proceedings of a three-day workshop to assess the problem, review available knowledge, and identify research needs on the impacts of electric power transmission lines on local and migratory movements of birds. The workshop was organized and sponsored by the National Power Plant Team and Oak Ridge Associated Universities.

FWS/OBS-78/49 to 78/53. This series of five maps ranks Federal coal-producing lands in five western States. Ranks are assigned according to the value of the lands for big and small game wildlife. These rankings are designated to evaluate the impacts of leasing coal in wildlife areas.

FWS/OBS-78/49. RANKING OF FEDERAL COAL LANDS, VOLUME 1, COLORADO. Colorado Division of Wildlife. 1978. 180 pp.

FWS/OBS-78/50. RANKING OF FEDERAL COAL LANDS, VOLUME 2, MONTANA. Montana Dept. of Fish and Game. 1978. 30 pp.

FWS/OBS-78/51. RANKING OF FEDERAL COAL LANDS, VOLUME 3, NORTH DAKOTA. North Dakota Game and Fish Department. 1978. 11 pp.

FWS/OBS-78/52. RANKING OF FEDERAL COAL LANDS, VOLUME 4, UTAH. Utah Division of Wildlife Resources. 47 pp.

FWS/OBS-78/53. RANKING OF FEDERAL COAL LANDS, VOLUME 5, WYOMING. Wyoming Game and Fish Department. 1978. 188 pp.

FWS/OBS-78/54. MANAGING OIL AND GAS ACTIVITIES IN COASTAL ENVIRONMENTS. W. L. Longley, R. Jackson, and B. Snyder. 1978. 63 pp.

For use by petroleum engineers, land managers, government officials, and others interested in preserving living resources. This report is intended to assist coastal land managers in reducing the impacts of oil and gas development on natural resources.

FWS/OBS-78/55. MULTIOBJECTIVE PROGRAMMING IN POWER PLANT LOCATION PLANNING. Thomas W. Eagles, Jared L. Cohon, Charles S. ReVelle, and John R. Current. 1979. 58 pp.

This study develops conceptual objectives for the minimization of impacts on the terrestrial and aquatic environment, implements these objectives in an operational location model, and demonstrates tradeoffs between costs and the environmental impacts of power plants.

FWS/OBS-78/56. WESTERN RESERVOIR AND STREAM HABITAT IMPROVEMENT HANDBOOK. Wayne Nelson et al. 1978. 250 pp.

This handbook describes and evaluates the success of 286 habitat and population improvement measures that were recommended for 90 Federal dam and reservoir projects in 19 western States. All improvement measures are accompanied by engineering drawings; cost/output data; evaluation of intended purposes; inherent limitations; past performances; and actual applications.

FWS/OBS-78/57. ELECTRIC POWER GENERATION AND TRANSMISSION DECISIONS AFFECTING FISH AND WILDLIFE RESOURCES. 1977. 99 pp.

This report discusses the existing regulatory operations of Federal and State agencies. It also defines the timing and requirements of key events within the decisionmaking process as they affect the licensing (construction, operations permits) of electric generation facilities. Key decisions which may affect fish and wildlife resources have been identified and discussed.

FWS/OBS-78/58. AVIAN MORTALITY AT MAN-MADE STRUCTURES: AN ANNOTATED BIBLIOGRAPHY. Paul F. Springer and Nancy S. Dailey. 1978. 108 pp.

This bibliography contains 853 summarized references pertaining to bird mortality due to collision and electrocution at man-made structures such as power transmission lines, radio and TV towers, lighthouses, cooling towers, buildings, and airport ceilometers. Subject, taxonomic, and geographic indexes are included.

FWS/OBS-78/59. AN APPROACH TO STREAM CLASSIFICATION. 1978.

This brochure describes FWS/OBS-78/23, STREAM CLASSIFICATION 1977.

FWS/OBS-78/60. ECOLOGICAL IMPLICATIONS OF GEOPRESSURED-GEOTHERMAL ENERGY DEVELOPMENT: TEXAS-LOUISIANA GULF COAST REGION. Thomas C. Gustavson et al. 1977. 670 pp.

This study contains two main sections in which the ramifications of the commercial development of thermal-hydraulic energy for the generation of power are reviewed from the different perspectives of the Gulf Coast region as an energy resource and as an ecological resource.

FWS/OBS-78/61. INSTREAM FLOW METHODOLOGIES FOR REGIONAL AND NATIONAL ASSESSMENT. IFIP No. 7. Keith Bayha. 1978. 98 pp.

This paper provides an indepth accounting of the effort made over a 4-year period to consider instream flow values as part of the Water Resource Council's Second National Water Assessment. It also summarizes a new method, developed subsequent to the National Assessment effort, which may provide an improved basis for assessing instream flow needs for level A and B planning studies.

FWS/OBS-78/62. Number not used.

FWS/OBS-78/63. Number not used.

FWS/OBS-78/64. MAP INDEXING SYSTEM: USERS MANUAL. Larry Salmen et al. 1978. 36 pp.

This manual describes the Map Indexing System (MIS) component of the FWS geographic information system. The manual contains a general overview of MIS components, directions on using the MIS to evaluate data bases, and suggestions on where to search if data is not in the system.

FWS/OBS-78/65. ENTRAINMENT IMPACT ESTIMATES USING THE EQUIVALENT ADULT APPROACH. C. Phillip Goodyear. 1978. 14 pp.

One approach to analyzing the importance of entrainment of fish eggs and larvae by power plants has been to estimate the number of adults that would have resulted from the entrained larvae. Certain limitations of a commonly used model can lead to serious underestimates of the actual impact. These limitations are discussed and an alternative formulation is presented which will reduce the bias.

FWS/OBS-78/66. SUMMARY OF AVAILABLE INFORMATION ON CHESAPEAKE BAY SUBMERGED VEGETATION. J. Court Stevenson and Nedra M. Confer. 1978. 335 pp.

Information on submerged aquatic vegetation in the Chesapeake Bay was compiled from a literature search. Information includes: biological summaries of dominant plant species, environmental values of aquatic plants, historic documentation, factors related to aquatic plant occurrence and growth, modelling, and management options.

FWS/OBS-78/67. Number not used.

FWS/OBS-78/68. RECOMMENDED STREAM RESOURCE MAINTENANCE FLOWS ON SEVEN SOUTHERN IDAHO STREAMS. IFIP NO. 8. Thomas A. Pruitt et al. 1978. 67 pp.

This paper documents the results of instream flow investigations conducted on seven southern Idaho streams during 1972-1975. The results were reanalyzed using the concept of probability-of-use curves which are based on weighted criteria for depth and velocity. Recommended stream resource maintenance flows are presented.

FWS/OBS-78/69. A CONCEPTUAL ECOLOGICAL MODEL FOR CHESAPEAKE BAY. Katherine A. Green. 1978. 22 pp.

A conceptual model for the Chesapeake Bay ecosystem (wetlands, tributaries, and bay proper) has been developed as an interrelated series of diagrams showing carbon and nutrient pathways. Information was based on an analysis of local literature and discussions with scientists who are studying the Bay. The ecological functions that produce the resources of commercial and recreational fisheries, habitat for migratory birds and other wildlife, waste disposal, and aesthetic water quality are indicated.

FWS/OBS-78/70. FISH AND WILDLIFE PROTECTION IN THE PLANNING AND CONSTRUCTION OF THE TRANS-ALASKA OIL PIPELINE. Thomas A. Morehouse, Robert A. Childers, and Linda E. Leask. 1978. 131 pp.

Focuses on fish and wildlife protection issues in the course of planning, establishing, and conducting monitoring activities; explores the rationale behind the decisionmaking process; and offers recommendations for improved environmental management in future cases.

FWS/OBS-78/71. ANNOTATED BIBLIOGRAPHY OF THE FISH AND WILDLIFE RESOURCES OF GALVESTON BAY. 2 Vols. Steven P. Christman, Howard I. Kochman, and Wallace S. Lippincott. 1978. Vol. I, 652 pp. Vol. II, 345 pp.

An annotated bibliography of 1600 references on fish and wildlife resources of Galveston Bay, Texas. Included are references on the ecology of the Galveston Bay system, upland areas adjacent to Galveston Bay in Harris, Chambers, and Galveston Counties and the marine environment offshore of Galveston Bay to the minus 60-foot contour in the Gulf of Mexico. Volume I includes abstracts and Volume II provides an index.

FWS/OBS-78/72. Number not used.

FWS/OBS-78/73. Number not used.

FWS/OBS-78/74. COASTAL SYSTEMS AND MANAGEMENT OPTIONS RELATED TO OUTER CONTINENTAL SHELF (OCS) DEVELOPMENT. Larry R. Shanks. 1978. 13 pp.

Assists local and State coastal planners in assessing onshore impacts of oil and gas developments on the Outer Continental Shelf. Major topics addressed include coastal system characteristics and physical and biological alterations of various operations.

FWS/OBS-78/75. A BIOLOGIST'S MANUAL FOR THE EVALUATION OF IMPACTS OF COAL-FIRED POWER PLANTS ON FISH, WILDLIE, AND THEIR HABITATS. B. G. Lewis, P. C. Chee, R. M. Goldstein, F. C. Kornegoy, D. L. Mabes, L. F. Soholt, and W. S. Vinikour. 1978. 206 pp.

Included are a description of coal-fired power plants and a discussion of power plant features having the potential for adverse effects on fish, wildlife, and their habitats. Information includes a description of each feature, summary of impacts, standards and criteria for evaluation, quantification of data, information requirements and sources, impact analysis, additional data sources, and references. The manual is designed to be used with FWS/OBS-78/29.

FWS/OBS-78/76. CLASSIFICATION, INVENTORY, AND ANALYSIS OF FISH AND WILDLIFE HABITAT - THE PROCEEDINGS OF A NATIONAL SYMPOSIUM, JANUARY 1977. Allan Marmelstein, Chairman. 1977. 604 pp.

Includes papers presented at the symposium 24-27 January 1977, in Phoenix, AZ. Subjects deal with user needs in the area of habitat classification; the various classification systems now in use for wetlands, wildlife habitats, and terrestrial and aquatic ecosystems; and ecological relationships important in habitat classification.

FWS/OBS-78/77. IMPACT PREDICTION MANUAL FOR GEOTHERMAL DEVELOPMENT. Woodward-Clyde Consultants. 1978. 200 pp.

This manual presents techniques for predicting probable effects of geothermal development on fish and wildlife resources in the West. Part one deals with the concepts underlying the manual; part two discusses cause-and-effect and describes qualitative and quantitative analysis of impacts. Appendices include an annotated bibliograpy; an example of a data collection program; a listing of endangered, threatened, and protected flora and fauna; and a supplement to erosion analysis techniques outlined in the manual.

FWS/OBS-78/78. CATALOG OF ALASKAN SEABIRD COLONIES. Arthur L. Sowls, Scott A. Hatch, and Calvin J. Lensink. 1978. 153 maps plus appendices.

A summary of data on the location, size, and species composition of seabird colonies along the Alaskan coast. The data are presented in the form of maps and tables showing the species composition and populations of all seabirds on a site-specific basis.

FWS/OBS-78/79. MANAGEMENT OF WINTERING BALD EAGLES. Karen Steenhof. 1978. 59 pp.

Provides managers of sanctuaries and public lands with information about managing land for bald eagles. This handbook is appropriate for lands used by migratory northern bald eagles during the nonbreeding winter season. Included are a review of the literature on species characteristics and requirements during winter, and management guidelines.

FWS/OBS-78/80. PHYSICAL REGIONALIZATION OF COASTAL ECOSYSTEMS OF THE UNITED STATES AND ITS TERRITORIES. Terry T. Terrell. 1979. 30 pp.

This project formulates a hierarchical regional classification scheme for partitioning coastal ecosystems of the U.S. and its territories, based on physical (hydrological and geological) characteristics. This classification will: (1) provide a data collection structure; and (2) delineate geographical zones about which predictions on the structure and functioning of ecosystems within these zones may be made.

FWS/OBS-78/81. SURFACE MINING AND FISH/WILDLIFE NEEDS IN THE EASTERN UNITED STATES: PROCEEDINGS OF A SYMPOSIUM. David E. Samuel, Jay R. Stauffer, Charles H. Hocutt, and William T. Mason, Jr., eds. 1978. 386 pp.

This symposium explored the relationships between mining and fish and wildlife, and the effect of PL95-87 (Surface Mining Control and Reclamation Act of 1977). Paper topics include lands unsuitable for mining; planning for fish and wildlife needs; methods for impact assessment; mining effects on water quality, aquatic and terrestrial wildlife; mined land reclamation; and wildlife management on mined lands.

FWS/OBS-78/81A. SURFACE MINING AND FISH/WILDLIFE NEEDS IN THE EASTERN UNITED STATES: ADDENDUM TO PROCEEDINGS OF A SYMPOSIUM. D. E. Samuel, J. R. Stauffer, C. H. Hocutt, and Wm. T. Mason, Jr., eds. 1979. 125 pp.

Panel discussion supplementing symposium proceedings in FWS/OBS-78/81.

FWS/OBS-78/82. IMPACT ASSESSMENT OF WATER RESOURCE DEVELOPMENT ACTIVITIES: A DUAL MATRIX APPROACH. Thomas A. Yorke. 1978. 27 pp.

A dual-matrix system for reviewing and evaluating the impact of water development projects on fish and wildlife resources is discussed. The system consists of generalized matrices; state-of-the-art literature reviews and syntheses for evaluating impacts, alternatives, and mitigation methodology; and a computer model for quantifying impacts. The generalized matrix presented in this report consists of summary statements of the impact of common water development projects on selected physical and chemical characteristics of streams.

FWS/OBS-78/83. FACTORS ASSOCIATED WITH ACCURACY IN SAMPLING FISH EGGS AND LARVAE. R. R. Bowles, U. V. Merriner, and G. C. Grant. 1978. [82] pp.

Ichthyoplankton sampling gear is reviewed and evaluated with emphasis on power plant impact assessment. Effects of biotic and abiotic factors on gear accuracy are discussed. A listing of commonly used sampling gear has been compiled and indexed by ecosystem. Features to be optimized in gear design and deployment are summarized.

FWS/OBS-78/84. A GUIDE FOR VEGETATING SURFACE-MINED LANDS FOR WILDLIFE IN EASTERN KENTUCKY AND WEST VIRGINIA. Barbara L. Rafaill and Willis G. Vogel. 1978. 89 pp.

A guidebook to aid land managers, landowners, and mine operators in revegetating surface-mined areas for wildlife. General wildlife requirements are discussed and particular wildlife species considered. In addition, habitat requirements and general planting patterns of benefit to wildlife are discussed and illustrated.

FWS/OBS-78/85. ECOLOGICAL STUDIES OF ONE CHANNELIZED AND TWO UNCHANNELIZED COASTAL SWAMP STREAMS IN NORTH CAROLINA. Melvin T. Huish and Garland B. Pardue. 1978. 72 pp.

This study was conducted to develop baseline information on the ecology of streams in coastal wooded swamps of the southeastern U.S. for use in impact assessment. Material is presented on stream chemical and physical characteristics, fish, and macroinvertebrates. The baseline data are valuable for predicting the consequences of modifying stream morphometry or flows in southern coastal swamp streams. Ecological differences between unchannelized and channelized streams are identified. The basic field data are included as a microfiche attachment.

FWS/OBS-78/86. REHABILITATION OF WESTERN WILDLIFE HABITAT: A REVIEW. Utah State University. 1978. 238 pp.

This publication provides a review of information regarding both the habitat requirements of key wildlife species and land rehabilitation techniques that have been successful. The geographic focus is on those habitats and rehabilitation efforts west of the cultivated prairies, with special emphasis placed on actual or anticipated sites of surface mining. Additional research needs are identified, as well as methods to improve the integration of habitat research and rehabilitation technology.

FWS/OBS-78/87. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOL. IV. EASTERN DECIDUOUS FOREST REGION. Robert O. Teskey and Thomas M. Hinckley. 1978. 54 pp.

See series abstract on p. 20.

FWS/OBS-78/88. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOL. V. NORTHERN FOREST REGION. Robert O. Teskey and Thomas M. Hinckley. 1978. 54 pp.

See series abstract on p. 20.

FWS/OBS-78/89. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOL. VI. PLAINS GRASSLAND REGION. Robert O. Teskey and Thomas M. Hinckley. 1978. 29 pp.

See series abstract on p. 20.

FWS/OBS-78/90. AN EMPIRICAL TRANSPORT MODEL FOR EVALUATING ENTRAINMENT OF AQUATIC ORGANISMS BY POWER PLANTS. John Boreman, C. Phillip Goodyear, and Sigurd W. Christensen. 1978. 67 pp.

This report presents the mathematical development of the generalized model, termed the Empirical Transport Model (ETM), along with several alternative formulations that could be used depending on the level of detail in data obtained from field studies. The model is applied to a hypothetical population inhabiting an estuary where several power plants are proposed to be sited.

FWS/OBS-78/91. FLORAL AND FAUNAL CHANGES IN LOWLAND HARDWOOD FORESTS IN MISSOURI RESULTING FROM CHANNELIZATION, DRAINAGE, AND IMPOUNDMENT. Leigh H. Fredrickson. 1979. 130 pp.

Provides a description of flora and fauna in lowland hardwood forests that were channelized, drained, or impounded near the St. Francis River, Missouri. Topics included effects on species composition, density, re-establishment, and growth of plants in lowland hardwood communities; effects on indicator species; and techniques for monitoring and predicting changes in flora and fauna. Alternatives for water resource developments are discussed.

FWS/OBS-78/92. EFFECTS OF STREAM CHANNELIZATION ON AQUATIC MACROINVERTEBRATES, BUENA VISTA MARSH, PORTAGE COUNTY, WISCONSIN. Robert N. Schmal and David F. Sanders. 1978. 80 pp.

An assessment of effects of channelization on density and biomass of benthic and drifting macroinvertebrates, amount of drifting seston, and water temperature and chemistry in the Buena Vista Marsh, Wisconsin. Data from 1974-1976 are presented from natural streams, newly channelized and old channelized ditches.

FWS/OBS-78/93. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME VII: MEDITERRANEAN REGION, WESTERN ARID AND SEMI-ARID REGION. M. Alice Walters, Robert O. Teskey, and Thomas M. Hinckley. 1980. 90 pp.

See series abstract on p. 20.

FWS/OBS-78/94. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOL. VIII. PACIFIC NORTHWEST AND ROCKY MOUNTAIN REGIONS. M. Alice Walters, Robert O. Teskey, and Thomas M. Hinckley. 1980. 53 pp.

See series abstract on p. 20.

FWS/OBS-78/95. MINED LAND RECLAMATION FOR FISH AND WILDLIFE IN THE EASTERN UNITED STATES. 1978. 12 pp.

This brochure discusses the Surface Mining Control and Reclamation Act, and its implication to fish and wildlife resources. It makes the point that regardless of the intended land use, there are ways to include fish and wildlife in the reclamation plan.

FWS/OBS-78/96. MOSS USER'S MANUAL. Larry Salmen, James Gropper, John Hamill, and Barbara Gentry. 1978. n.p.

The Map Overlay and Statistical System (MOSS) User's Manual is designed for trained users of the MOSS interactive graphics software. MOSS has been designed to allow users to retrieve, spatially analyze, and display any map data stored in the system.

FWS/OBS-78/97. PROCEEDINGS OF THE NATIONAL WETLAND PROTECTION SYMPOSIUM, RESTON, VA, JUNE 6-8, 1977. John H. Montanari and Jon A. Kusler, co-chairmen. 1978. 255 pp.

A collection of papers from a symposium on wetland protection. Paper topics include an overview of wetland hazards and values, development impacts, State wetland programs, Federal agency roles in wetland protection, wetland uses and misuses, legal issues, wetland mapping, wetland rehabilitation, role of the private sector and the public, and research priorities.

FWS/OBS-78/98. STRENGTHENING STATE WETLAND REGULATIONS. Jon A. Kusler. 1978. 147 pp.

This report was prepared to assist States in developing and strengthening wetland protection programs. It examines State and conjunctive State and local wetland protection efforts and suggests improvements. Two versions of a draft statute provide a basis for new wetland protection efforts.

FWS/OBS-78/99. Number not used.

FWS/OBS-79/01. COASTAL ECOSYSTEMS CHARACTERIZATIONS - A SUMMARY OF ACTIVITIES FY75 THROUGH FY79. 1979. 21 pp. Not available.

A summary of activities of two FWS projects, designed to gather ecological information for use in the development of effective methods to protect habitats and manage fish and wildlife resources in coastal ecosystems that may be impacted by energy development. Coastal areas studied include the Chenier Plain of Louisiana and Texas, the Pacific Northwest, the Sea Islands of South Carolina and Georgia, and the Maine coast.

FWS/OBS-79/02. DEVELOPMENT AND EVALUATION OF INFORMATION TRANSFER PROCEDURES FOR FISH AND WILDLIFE SERVICE FIELD OFFICES AND BIOLOGICAL SERVICES TEAMS. Robert L. Little and Joe W. Hardy. 1979. 31 pp.

Results of an information transfer pilot project designed to define the roles and responsibilities of the Biological Services Program in bridging the gap between FWS research and operations.

FWS/OBS-79/03. ELEMENTS IN NEGOTIATING STREAM FLOWS ASSOCIATED WITH FEDERAL PROJECTS. INFORMATION PAPER NO. 9. 1979. 41 pp.

This report incorporates ideas for use in negotiations intended to solve water resource planning problems and makes that information available to encourage discussion and exploration of the issues presented.

FWS/OBS-79/04. Number not used.

FWS/OBS-79/05 to 79/07. This 3-volume series describes the ecological characteristics of the Mississippi Deltaic Plain region. The overall study purpose was to collect, organize, and analyze available information from various disciplines (e.g., geology, biology, socioeconomics) that will describe each part of the regional ecosystem, and its relation to the whole. See also FWS/OBS-81/16.

FWS/OBS-79/05. MISSISSIPPI DELTAIC PLAIN ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY. VOL. I - SYNTHESIS PAPERS. Douglas K. Larsen et al. 1980. 368 pp.

FWS/OBS-79/06. MISSISSIPPI DELTAIC PLAIN ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY. VOL. II - MAP NARRATIVES. Douglas K. Larsen et al. 1980. 112 pp.

FWS/OBS-79/07. MISSISSIPPI DELTAIC PLAIN REGION ECOLOGICAL CHARACTERIZATION: A HABITAT MAPPING STUDY. A USER'S GUIDE TO THE HABITAT MAPS. Karen M. Wicker. 1980. 79 pp.

This guide is designed to be used with the habitat maps published in FWS/OBS-79/06.

FWS/OBS-79/08. COASTAL WATERBIRD COLONIES: MAINE TO VIRGINIA, 1977. AN ATLAS SHOWING COLONY LOCATIONS AND SPECIES COMPOSITION. Carl E. Korschgen and R. Michael Erwin. 1979. 647 pp.

Surveys were conducted during the spring and summer of 1976 and 1977 to locate and describe all nesting colonies of coastal waterbirds from the Maine-Canada border to the southern boundary of Virginia. Both aerial and ground methods were used to obtain estimates of nesting populations. The maps and tables in this atlas report the findings of these surveys.

FWS/OBS-79/09. COASTAL WATERBIRD COLONIES: MAINE. Carl E. Korschgen. 1979. 83 pp.

Waterbird colonies along the coast of Maine were inventoried during the nesting seasons of 1976 and 1977. A total of 353 colony sites was found; they contained 100,813 pairs of birds. Nineteen species nested in the study area. A count of nests of adult birds made during on-site inspections was the best inventory technique. Species abundance and nesting locations are listed.

FWS/OBS-79/10. COASTAL WATERBIRD COLONIES: CAPE ELIZABETH, MAINE TO VIRGINIA. R. Michael Erwin. 1979. 212 pp.

In 1976 and 1977, seabird and wading bird nesting colonies were inventoried along the northeast U.S. Coast from Cape Elizabeth, Maine to the Virginia-North Carolina border. A parallel study was conducted for the rocky, island bound coastal region of Maine, north of Cape Elizabeth. Colonies were surveyed and censused from March to July by teams of biologists using aerial and ground-based methods.

FWS/OBS-79/11 to 79/15. This series of publications presents the results of one of four similar projects of the Fish and Wildlife Service to characterize key coastal areas of the United States. The intent is to provide the means of assessing and minimizing impacts of human activities in important fish and wildlife habitats. This ecological characterization serves the needs of decision-makers and researchers by supplying integrated information for impact assessments and analyses, and uncovering research needs.

FWS/OBS-79/11. AN ECOLOGICAL CHARACTERIZATION OF THE PACIFIC NORTHWEST COASTAL REGION. VOL. I. CONCEPTUAL MODEL. Charles M. Proctor et al. 1980. 224 pp.

The general framework for organizing the characterization is contained in this first volume.

FWS/OBS-79/12. AN ECOLOGICAL CHARACTERIZATION OF THE PACIFIC NORTHWEST COASTAL REGION. VOL. 2. CHARACTERIZATION ATLAS-REGIONAL SYNOPSIS. Charles M. Proctor et al. 1980. 574 pp.

FWS/OBS-79/13. AN ECOLOGICAL CHARACTERIZATION OF THE PACIFIC NORTHWEST COASTAL REGION. VOL. 3. CHARACTERIZATION ATLAS, ZONE AND HABITAT DESCRIPTIONS. Charles M. Proctor et al. 1980. 327 pp.

FWS/OBS-79/14. AN ECOLOGICAL CHARACTERIZATION OF THE PACIFIC NORTHWEST COASTAL REGION. VOL. 4. CLASSIFICATION ATLAS, WATERSHED UNIT DESCRIPTIONS. Charles M. Proctor et al. 1980. 551 pp.

FWS/OBS-79/15. AN ECOLOGICAL CHARACTERIZATION OF THE PACIFIC NORTHWEST COASTAL REGION. VOL. 5. DATA SOURCE APPENDIX. Charles M. Proctor et al. 1980. 70 pp.

FWS/OBS-79/16. ENTRAINMENT OF ICHTHYOPLANKTON BY IRRIGATION WITHDRAWAL SYSTEMS. William R. Nelson and Lance G. Beckman. 1979. 36 pp.

This study was designed to: (1) determine the potential for entraining ichthyoplankton by synthesizing the location and number of irrigation structures with knowledge of the reproductive characteristics of Missouri River fishes; (2) develop a methodology to sample irrigation pump effluents and determine the extent of ichthyoplankton entrainment; and (3) evaluate and update present guidelines to conform with the study's results.

FWS/OBS-79/17. Number not used.

FWS/OBS-79/18. Number not used.

FWS/OBS-79/19 and 79/19-A. Provide a framework for standard, consistent collection of ecological facts concerning species of vertebrates and selected invertebrates. The data catalog format is designed to facilitate computerized data entry.

FWS/OBS-79/19. A PROCEDURE FOR DESCRIBING FISH AND WILDLIFE: CODING INSTRUCTIONS FOR PENNSYLVANIA. William T. Mason, Jr., Charles T. Cushwa, Lawrence J. Slaski, and Douglas N. Gladwin. 1979. 21 pp.

FWS/OBS-79/19-A. A PROCEDURE FOR DESCRIBING FISH AND WILDLIFE FOR PENNSYLVANIA: SUMMARY EVALUATION REPORT. Charles T. Cushwa, et al. 1980. 15 pp.

FWS/OBS-79/20. Number not used.

FWS/OBS-79/21. Number not used.

FWS/OBS-79/22. MANAGEMENT OF TRANSMISSION LINE RIGHTS-OF-WAY FOR FISH AND WILDLIFE. Michael Galvin. 1979.

VOL. I: BACKGROUND INFORMATION. 168 pp.
VOL. II: EASTERN U.S. 347 pp.
VOL. III: WESTERN U.S. 519 pp.

Volume I presents general information on wildlife management and vegetation maintenance techniques for aiding in the development and implementation of resource management plans in overhead electric transmission line rights-of-way. Volume II contains specific information on plant responses to rights-of-way maintenance methods in the eastern U.S. Volume III provides information similar to Volume II for the western U.S.

FWS/OBS-79/23. ECOLOGICAL AND PHYSIOLOGICAL/TOXICOLOGICAL EFFECTS OF PETROLEUM ON AQUATIC BIRDS. A SUMMARY OF RESEARCH ACTIVITIES FY76 THROUGH FY78. Lucille F. Stickel and Michael P. Dieter. 1979. 14 pp.

The physiological and ecological effects of oil on waterbirds were examined in a series of laboratory and field experiments, including studies of the effects of oiling on hatchability of eggs; the effects of an oil-contaminated diet on physiological condition, reproduction, and survival; and the accumulation of oil in body tissues. A chemical methodology was developed in support of these studies.

FWS/OBS-79/24. DECLINE OF SUBMERGED AQUATIC PLANTS IN CHESAPEAKE BAY. J. Court Stevenson, Nedra Confer, and Catherine B. Pieper. 1979. 12 pp.

This brochure summarizes highlights of a study on the decline of submerged aquatic grass beds in the Chesapeake Bay, entitled: "Summary of available information on Chesapeake Bay Submerged Vegetation", by Univ. Maryland Laboratory Center for Environmental Estuarine Studies at Horn Point, MD.

FWS/OBS-79/25. AN ANNOTATED BIBLIOGRAPHY ON PLANNING AND MANAGEMENT FOR URBAN-SUBURBAN WILDLIFE. 1979. 256 pp.

This bibliography identifies various publications dealing with management of urban and suburban wildlife, and provides background information helpful to planners, biologists, and others in the development and management of wildlife resources in urban and suburban areas.

FWS/OBS-79/26. BIOLOGICAL SERVIES PROGRAM REPORT, FY77-78. 1979. 98 pp.

Describes the activities of the Biological Services Program (BSP). Includes a summary of projects and a bibliography of BSP publications.

FWS/OBS-79/27. COOPERATIVE INSTREAM FLOW SERVICE GROUP, SEPTEMBER 1977-DECEMBER 1978. 1979. 16 pp.

This brief report is intended to serve as both an introduction to the Instream Flow Group and its second annual report. It recaps the history of the Group, its goals and activities.

FWS/OBS-79/28. MISSISSIPPI DELTAIC PLAIN REGION CHARACTERIZATION STUDY. 1979. 9 pp.

Brochure describing the project which resulted in the publication of FWS/OBS-79/05, 79/06, and 79/07.

FWS/OBS-79/29. Number not used.

FWS/OBS-79/30. AN INTRODUCTION TO THE ENVIRONMENTAL LITERATURE OF THE MISSISSIPPI DELTAIC PLAIN REGION. Vohannes L. van Beek et al. 1981. 208 pp.

This report is a review of selected environmental literature of the Mississippi Deltaic Plain Region. This review introduces some of the major ecosystem components and processes, describes oil and gas production activities, and guides the reader to available literature.

FWS/OBS-79/31. CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. Lewis M. Cowardin. 1979. 103 pp.

Describes a new classification system for wetlands and deepwater habitats, designed to replace the FWS Circular 39 System. This new classification describes ecological taxa, arranges them in a system useful to resource managers, furnishes units for mapping, and provides uniformity of concepts and terms. Wetlands are classified by plants, soils, and frequency of flooding.

FWS/OBS-79/32. BIBLIOGRAPHIC SEARCH CAPABILITIES - REVISION C. 1979. 11 pp.

Describes the bibliographic search capabilities of the National Coastal Ecosystems Team. Presented are a comprehensive list of available bibliographic resources, a partial list of nonbibliographic data bases, a checklist for preparation of an information request, and a sample computer search.

FWS/OBS-79/33. RESPONSES OF SUBMERSED VASCULAR PLANT COMMUNITIES TO ENVIRONMENTAL CHANGE. Graham J. Davis and Mark M. Brinson. 1980. 79 pp.

This report examines the responses of submersed vascular plants to changing environmental conditions, primarily those that affect light transmission. Survival indices were also calculated for several species typically found in clearwater lakes. The report concludes with a brief discussion of the potential effects of human activities on submersed plant communities. A summary of this publication can be found in FWS/OBS-80/42.

FWS/OBS-79/34. Number not used.

FWS/OBS-79/35. LITERATURE REVIEW AND SYNTHESIS OF INFORMATION ON PACIFIC ISLAND ECOSYSTEMS. John E. Byrne, ed. 1979. 337 pp.

This volume consists of ten sections, each containing a category of information about Pacific islands under U.S. jurisdiction: (1) wildlife refuges and endangered species; (2) terrestrial botany; (3) birds; (4) freshwater macrofauna; (5) marine plants; (6) coral reefs; (7) marine macroinvertebrates excluding corals and reef-building organisms; (8) reef and shore fishes; (9) harvested marine resources; and (10) socioeconomics.

FWS/OBS-79/36. PROTECTING INSTREAM FLOWS IN MONTANA: YELLOWSTONE RIVER RESERVATION CASE STUDY. IFIP NO. 10. Debra A. Sweetman. 1980. 75 pp.

The intent of this paper is to provide a review of the method utilized by the Montana Board of Natural Resources and Conservation in making the Yellowstone River reservation determinations. It also discusses the usefulness of this form of water allocation.

FWS/OBS-79/37. GUIDELINES FOR PREPARING EXPERT TESTIMONY IN WATER MANAGEMENT DECISIONS RELATED TO INSTREAM FLOW ISSUES. IFIP NO. 1 REVISED. Berton L. Lamb and Debra A. Sweetman. 1979. 33 pp.

The guidelines provide instructions and background information to biologists who believe their work may become part of a formal adjudication or administrative hearing. Topics covered include types of hearings, discovery procedures, and rules of evidence. Samples of testimony are also included. (Supersedes FWS/OBS-77/19.)

FWS/OBS-79/38. Number not used.

FWS/OBS-79/39. THE ECOLOGY OF INTERTIDAL FLATS OF NORTH CAROLINA: A COMMUNITY PROFILE. Charles H. Peterson and Nancy M. Peterson. 1979. 73 pp.

Description of intertidal flats community, including the physical environment, plants, benthic fauna, mobile epibenthic invertebrates, fish, and birds. Provides background needed by coastal planners and environmental scientists.

FWS/OBS-79/40 to 79/45. This series of six publications presents the results of one of four similar projects of the Fish and Wildlife Service to characterize key coastal areas of the United States. The intent is to provide the means of assessing and minimizing impacts of human activities in important fish and wildlife habitats. This ecological characterization serves the needs of decision-makers and researchers by supplying integrated information for impact assessments and analyses, and uncovering research needs.

FWS/OBS-79/40. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA. VOL. I: PHYSICAL FEATURES OF THE CHARACTERIZATION AREA. T. D. Mathews et al., eds. 1980. 212 pp.

FWS/OBS-79/41. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA. VOL. II: SOCIOECONOMIC FACTORS. T. D. Mathews et al., eds. 1980. 321 pp.

FWS/OBS-79/42. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA. VOL. III: BIOLOGICAL FEATURES. T. D. Mathews et al., eds. 1980. 620 pp.

FWS/OBS-79/43. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA. VOL. IV: ATLAS. T. D. Mathews et al., eds. 1980. 35 pp.

FWS/OBS-79/44. DIRECTORY OF INFORMATION SOURCES. T. D. Mathews et al., eds. 1979. 35 pp.

FWS/OBS-79/45. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA. EXECUTIVE SUMMARY. T. D. Mathews et al., eds. 1980. 51 pp.

FWS/OBS-79/46. GREAT LAKES INFORMATION MANAGEMENT SYSTEM (GLIMS) CONTRACTOR GUIDELINES. D. A. Lewis and G. F. Kuacir. December 1979. 32 pp.

This manual summarizes the U.S. Fish and Wildlife Service Great Lakes Information Management System (GLIMS) and specifies the basic procedures to be used by contractors supplying data to the system. The system contains map-based natural resource data.

FWS/OBS-79/47. Number not used.

FWS/OBS-79/48.1. A SUMMARY OF FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL IN THE UNITED STATES. PART 1: FISH AND WILDLIFE INFORMATION NEEDS IN THE FEDERAL SURFACE MINING PERMANENT REGULATIONS. Science Applications, Inc. 1980. 103 pp.

Designed to assist government agencies and private citizens in determining fish and wildlife information needs for new coal mining operations pursuant to the Surface Mining Control and Reclamation Act of 1977. Included are: (1) summary of references to fish and wildlife in SMCRA permanent regulations; and (2) selected sections of the surface mining permanent Federal regulations dealing with fish and wildlife needs.

FWS/OBS-79/48.2. A SUMMARY OF FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL IN THE UNITED STATES. PART 2: THE STATUS OF STATE SURFACE MINING REGULATIONS AS OF JANUARY 1980 AND THE FISH AND WILDLIFE INFORMATION NEEDS. Science Applications, Inc. 1980. 61 pp.

Documentation of fish and wildlife information needs identified in the State regulations of compliance to PL95-87. Also includes documentation of the status of individual State surface mining regulations as of January 1980 in those States having significant strippable reserves or active strip mining operations.

FWS/OBS-79/48.3.1 to 79/48.3.5. This series consists of five handbooks, one for each of the Office of Surface Mining (OSM) regions. Each handbook contains information on protection and enhancement of, and reduction of impacts to, fish and wildlife resources during the surface mining of coal. It gives information pertaining to consideration of fish and wildlife resources in the premining, mining, reclamation, and compliance phases of surface mining. Suggested methods and sources for obtaining the information necessary to satisfy State and Federal regulations for each particular OSM region are included.*

FWS/OBS-79/48.3.1. A HANDBOOK FOR MEETING FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL - OSM REGION I. Charles R. Hinkle, Richard E. Ambrose, and Calvin R. Wenzel. 1981. 145 pp. plus appendices.

FWS/OBS-79/48.3.2. A HANDBOOK FOR MEETING FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL - OSM REGION II. Charles R. Hinkle, Richard E. Ambrose, and Calvin R. Wenzel. 1981. 368 pp.

FWS/OBS-79/48.3.3. A HANDBOOK FOR MEETING FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL - OSM REGION III. Charles R. Hinkle, Richard E. Ambrose, and Calvin R. Wenzel. 1981. 367 pp.

FWS/OBS-79/48.3.4. A HANDBOOK FOR MEETING FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL - OSM REGION IV. Charles R. Hinkle, Richard E. Ambrose, and Calvin R. Wenzel. 1981. 363 pp.

FWS/OBS-79/48.3.5. A HANDBOOK FOR MEETING FISH AND WILDLIFE INFORMATION NEEDS TO SURFACE MINE COAL - OSM REGION V. Charles R. Hinkle, Richard E. Ambrose, and Calvin R. Wenzel. 1981. 405 pp.

FWS/OBS-79/49. HABITAT PRESERVATION ABSTRACTS. Office of Biological Services. 1979. 103 pp.

Habitat Preservation Abstracts is an announcement publication intended to make the information provided by the Habitat Preservation Programs of the U.S. Fish and Wildlife Service more widely known and accessible.

This publication brings together information on the Biological Services, Environmental Contaminants Evaluation, and Land and Water Resource Development Planning Programs.

FWS/OBS-80/01. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES. National Fish and Wildlife Laboratory. 1980. Not available.

The purpose of this series of species accounts is to provide resource managers and the public with information about Federally listed endangered and/or threatened vertebrate species that occur along, or within 100 kilometers of, the seacoast of the United States. Information about life history, distribution, habitat requirements, and conservation of the subject species is included.

FWS/OBS-80/01.1. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE RED WOLF. 1980. 6 pp.

FWS/OBS-80/01.2. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - BLUNT-NOSED LEOPARD LIZARD. 1980. 6 pp.

FWS/OBS-80/01.3. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE WHOOPING CRANE. 1980. 9 pp.

FWS/OBS-80/01.4. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - LIGHT-FOOTED CLAPPER RAIL. 1980. 7 pp.

FWS/OBS-80/01.5. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SAN CLEMENTE LOGGERHEAD SHRIKE. 1980. 5 pp.

FWS/OBS-80/01.6. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE PINE BARRENS TREEFROG. 1980. 5 pp.

FWS/OBS-80/01.7. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE RED-COCKADED WOODPECKER. 1980. 9 pp.

FWS/OBS-80/01.8. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - IVORY-BILLED WOODPECKER. 1980. 12 pp.

FWS/OBS-80/01.9. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE OCELOT. 1980. 5 pp.

FWS/OBS-80/01.10. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE ATTWATER'S GREATER PRAIRIE CHICKEN. 1980. 5 pp.

FWS/OBS-80/01.11. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE CAPE SABLE SPARROW. 1980. 6 pp.

FWS/OBS-80/01.12. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - LEATHERBACK SEA TURTLE. 1980. 7 pp.

FWS/OBS-80/01.13. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - GREEN SEA TURTLE. 1980. 9 pp.

FWS/OBS-80/01.14. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE TEXAS BLIND SALAMANDER. 1980. 5 pp.

FWS/OBS-80/01.15. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - YUMA CLAPPER RAIL. 1980. 7 pp.

FWS/OBS-80/01.16. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SANTA BARBARA SONG SPARROW. 1980. 5 pp.

FWS/OBS-80/01.17. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - ESKIMO CURLEW. 1980. 7 pp.

FWS/OBS-80/01.18. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SOUTHERN SEA OTTER. 1980. 8 pp.

FWS/OBS-80/01.19. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - MORRO BAY KANGAROO RAT. 1980. 5 pp.

FWS/OBS-80/01.20. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - CALIFORNIA LEAST TERN. 1980. 8 pp.

FWS/OBS-80/01.21. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - KIRTLAND'S WARBLER. 1980. 5 pp.

FWS/OBS-80/01.22. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - HAWKSBILL TURTLE. 1980. 6 pp.

FWS/OBS-80/01.23. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE INDIANA BAT. 1980. 8 pp.

FWS/OBS-80/01.24. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE ATLANTIC SALT MARSH SNAKE. 1980. 5 pp.

FWS/OBS-80/01.25. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE DUSKY SEASIDE SPARROW. 1980. 6 pp.

FWS/OBS-80/01.26. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - HAWAIIAN GOOSE (NENE). 1980. 9 pp.

FWS/OBS-80/01.27. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - COLUMBIAN WHITE-TAILED DEER. 1980. 6 pp.

FWS/OBS-80/01.28. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SALT MARSH HARVEST MOUSE. 1980. 5 pp.

FWS/OBS-80/01.29. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - PUERTO RICAN PARROT. 1980. 7 pp.

FWS/OBS-80/01.30. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - KEMP'S (ATLANTIC) RIDLEY SEA TURTLE. 1980. 7 pp.

FWS/OBS-80/01.31. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - BACHMAN'S WARBLER. 1980. 4 pp.

FWS/OBS-80/01.32. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE FLORIDA EVERGLADE KITE. 1980. 5 pp.

FWS/OBS-80/01.33. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - PUERTO RICAN WHIP-POOR-WILL. 1980. 6 pp.

FWS/OBS-80/01.34. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - ALEUTIAN CANADA GOOSE. 1980. 9 pp.

FWS/OBS-80/01.35. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - WEST INDIAN MANATEE. 1980. 9 pp.

FWS/OBS-80/01.36. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - ISLAND NIGHT LIZARD. 1980. 5 pp.

FWS/OBS-80/01.37. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE DELMARVA PENINSULA FOX SQUIRREL. 1980. 6 pp.

FWS/OBS-80/01.38. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE HOUSTON TOAD. 1980. 6 pp.

FWS/OBS-80/01.39. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE AMERICAN ALLIGATOR. 1980. 9 pp.

FWS/OBS-80/01.40. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - BROWN PELICAN EASTERN AND CALIFORNIA SUBSPECIES. 1980. 16 pp.

FWS/OBS-80/01.41. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE JAGUAR. 1980. 6 pp.

FWS/OBS-80/01.42. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE GRAY BAT. 1980. 7 pp.

FWS/OBS-80/01.43. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE OKALOOSA DARTER. 1980. 5 pp.

FWS/OBS-80/01.44. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE EASTERN COUGAR. 1980. 4 pp.

FWS/OBS-80/01.45. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE JAGUARUNDI. 1980. 5 pp.

FWS/OBS-80/01.46. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE FLORIDA PANTHER. 1980. 8 pp.

FWS/OBS-80/01.47. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE AMERICAN CROCODILE. 1980. 7 pp.

FWS/OBS-80/01.48. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THE KEY DEER. 1980. 5 pp.

FWS/OBS-80/01.49. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - LAYSAN DUCK. 1980. 6 pp.

FWS/OBS-80/01.50. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - RED HILLS SALAMANDER. 1980. 4 pp.

FWS/OBS-80/01.51. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - ARCTIC PEREGRINE FALCON. 1980. 9 pp.

FWS/OBS-80/01.52. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - MISSISSIPPI SANDHILL CRANE. 1980. 8 pp.

FWS/OBS-80/01.53. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - GRAY WOLF. 1980. 11 pp.

FWS/OBS-80/01.54. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - THICK-BILLED PARROT. 1980. 8 pp.

FWS/OBS-80/01.55. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SAN CLEMENTE SAGE SPARROW. 1980. 4 pp.

FWS/OBS-80/01.56. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - CALIFORNIA CLAPPER RAIL. 1980. 7 pp.

FWS/OBS-80/01.57. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - AMERICAN PEREGRINE FALCON. 1980. 14 pp.

FWS/OBS-80/01.58. SELECTED VERTEBRATE ENDANGERED SPECIES OF THE SEACOAST OF THE UNITED STATES - SANTA CRUZ LONG-TOED SALAMANDER. 1980. 6 pp.

FWS/OBS-80/02. EFFECTS OF SOUND AND SHOCK WAVES ON MARINE VERTEBRATES: AN ANNOTATED BIBLIOGRAPHY. J. R. Jehl, Jr., M. J. White, Jr., and S. I. Bond. 1980. 6 pp.

This report introduces resource managers and researchers to the literature about the interaction between underwater acoustic signals and fishes, birds, and mammals. Topics include the effects of various noises and explosions and the use of sound as an attractant or deterrent.

FWS/OBS-80/03. BEACHED MARINE BIRDS AND MAMMALS OF THE NORTH AMERICAN WEST COAST: A MANUAL FOR THEIR CENSUS AND IDENTIFICATION. D. G. Ainley et al. 1980. 207 pp.

Provides information necessary for the correct identification of beach-cast specimens of marine birds and mammals. Identification keys are supplemented by illustrations, glossaries, and narrative accounts of species. Instructions are included for the conduct of beach surveys. Species included are marine birds and mammals that occur from the Bering Strait, Alaska along the North American Coast south to Cabo San Lucas at the southern tip of Baja California, Mexico.

FWS/OBS-80/04. OBSERVATIONS OF MARINE BIRDS AND MAMMALS IN THE NORTHERN CHESAPEAKE BIGHT. Richard A. Rowlett. 1980. 87 pp.

Summary of observations on the spatial and temporal distributions of marine birds and mammals observed in Atlantic Ocean waters over the Continental Shelf between latitudes 37° N and 39° N. These records were gathered from 1971-1977 off the coasts of Delaware, Maryland, and Virginia.

FWS/OBS-80/05. ATLAS OF GULL AND TERN COLONIES: NORTH CAROLINA TO KEY WEST, FLORIDA. J. W. Portnoy, R. M. Erwin, and T. W. Custer. 1981. 121 pp.

Colonies of pelicans, cormorants, gulls, terns, and black skimmers were inventoried in 1976 from North Carolina to Key West, Florida. Five teams of investigators used ground and aerial counts of nests or adults, or both, throughout the spring and summer. This atlas shows the location of each known active colony and includes information on nesting site and substrate, species composition and numbers, nesting stage, and inventory method.

FWS/OBS-80/06. GUIDE TO THE NATIONAL POWER PLANT TEAM'S BIBLIOGRAPHIC DATA BASE. Hillary Ann Handwerger and Kathy Ann Gildren. 1980. 48 pp.

This guide describes the automated bibliographic files of the National Power Plant Team's library. This system is no longer functional.

FWS/OBS-80/07. IMPACTS OF NAVIGATIONAL DREDGING ON FISH AND WILDLIFE: A LITERATURE REVIEW. Kenneth O. Allen. 1980. 81 pp.

Literature about the impacts of navigational dredging on fish, other aquatic biota, and wildlife is reviewed. Also included are types of dredging equipment, characteristics of dredged material, evaluation of dredged material pollution potential, and habitat development and enhancement opportunities arising from dredged material disposal. The discussions about impacts and habitat development are divided into "Coastal Waters" and "Rivers". A limited discussion of the "Great Lakes" is included as an Appendix.

FWS/OBS-80/08 and 80/09. A 5-year investigation of the effects of floodplain gravel mining on the physical and biological characteristics of river systems in arctic and subarctic Alaska is described. Twenty-five sites were studied within four geographic regions. The field data collection program covered the major disciplines of hydrology/hydraulics, aquatic biology, water quality, and terrestrial biology. In addition, geotechnical engineering, and aesthetics site reviews were conducted.

FWS/OBS-80/08. GRAVEL REMOVAL STUDIES IN ARCTIC AND SUBARCTIC FLOODPLAINS IN ALASKA. Woodward-Clyde Consultants. 1980 403 pp.

Synthesizes and evaluates the data collected at the sites.

FWS/OBS-80/09. GRAVEL REMOVAL GUIDELINES MANUAL FOR ARCTIC AND SUBARCTIC FLOODPLAINS. Woodward-Clyde Consultants. 1980. 169 pp.

Aids the user in planning and operating material sites to minimize environmental effects. (See abstract on p. 47).

FWS/OBS-80/10. FRESHWATER NEEDS OF FISH AND WILDLIFE RESOURCES IN THE NUECES-CORPUS CHRISTI BAY AREA, TEXAS: A LITERATURE SYNTHESIS. Don E. Henley and Donald G. Rauschuber. 1981. 410 pp.

Topics includes short and long term freshwater needs; ecological impact of reduced freshwater inflows; impact of and need for return flows of domestic, industrial, and agricultural water into the Bay system; ecological impact of the proposed Harbor Island Deep-Water Port construction on the Bay system; and recommendations for freshwater inflow management.

FWS/OBS-80/11 and 80/12. These reports synthesize and annotate available literature relating to the effects of bank stabilization on the physical and chemical characteristics of streams. Annotated references to the literature which formed the basis for the synthesis are contained in FWS/OBS-80/12. The synthesis, FWS/OBS-80/11, provides guidelines for planning bank protection and stabilization activities.

FWS/OBS-80/11. EFFECTS OF BANK STABILIZATION ON THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF STREAMS AND SMALL RIVERS: A SYNTHESIS. 43 pp.

FWS/OBS-80/12. EFFECTS OF BANK STABILIZATION ON THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF STREAMS AND SMALL RIVERS: AN ANNOTATED BIBLIOGRAPHY. 88 pp.

FWS/OBS-80/13 and 80/14. These reports describe an investigation of the effects of stream channelization on fish and macroinvertebrates in low gradient reaches of Blacksmith Fork River and the Logan River in northern Utah. The long term physical and biological consequences of channel modification, especially with regard to the high value fishery resource, are of special concern.

FWS/OBS-80/13. EFFECTS OF ALTERATIONS TO LOW GRADIENT REACHES OF UTAH STREAMS: SUMMARY. Richard S. Wydoski and William T. Helm. 1980. 17 pp.

A summary of FWS/OBS-80/14.

FWS/OBS-80/14. EFFECTS OF ALTERATIONS TO LOW GRADIENT REACHES OF UTAH STREAMS. Richard S. Wydoski and William T. Helm. 1980. 176 pp.

FWS/OBS-80/15. TIDAL MARSHES - THE BOUNDARY BETWEEN LAND AND OCEAN. James Gosselink. 1980. 12 pp.

This brochure describes estuarine intertidal emergent wetlands; topics include human impacts, origins of tidal marshes, marsh ecosystem, and food chain, and the value of tidal marshes.

FWS/OBS-80/16. THE EFFECTS OF LOW LEVELS OF OIL ON AQUATIC BIRDS - A NON-TECHNICAL SUMMARY OF RESEARCH ACTIVITIES FY76 THROUGH FY78. John O. Biderman and William H. Drury. 1980. 5 pp.

A summary of research activities from July 1975 to September 1978 concerning the effects of petroleum on aquatic birds. Topics include: effects of oiling on egg hatchability; effects of oil ingestion on physiological condition, survival, and reproduction in birds; accumulation and loss of oil by birds; and development of analytical methods for identification and quantification of oil breakdown products in tissues and eggs of ducks.

FWS/OBS-80/17. IMPACT OF STREAM ALTERATIONS ON RIPARIAN COMMUNITIES IN SOUTH-CENTRAL OKLAHOMA. John S. Barclay. 1980. 91 pp.

This report summarizes the findings of a study undertaken to supply information of a quantitative nature on the effects of stream channelization and impoundment on riparian wildlife and vegetation within the southern grasslands of the United States. The study supplies data on channelization and land use changes from 16 study sites and on the effects of impoundment from four study sites on tributaries of the Washita River, all located within grassland ecoregions in Oklahoma.

FWS/OBS-80/18. POWER PLANT PROJECT WORKSHOP.

Limited distribution slide show. Not available.

FWS/OBS-80/19 and 80/20. The purpose of this study is to compile and synthesize information from existing sources concerning the natural, physical, and social components of the ecosystems with the 24-county study area along the coast of Texas. The topics of the socioeconomic papers compiled in Volume 1 are oil and gas production, recreation/tourism industry, commercial fishing, transportation, industrial and residential development and agricultural production. Data compilations in the form of tables and charts that support these papers are in Volume 2.

FWS/OBS-80/19. TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY, VOLUME 1: SYNTHESIS PAPERS. Edward B. Liebow et al. 1980. 277 pp.

FWS/OBS-80/20. TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY, VOLUME 2: DATA APPENDIX. Edward B. Liebow et al. 1980. [500] pp.

FWS/OBS-80/21. Number not used.

FWS/OBS-80/22. NATURAL RESOURCE PROTECTION AND PETROLEUM DEVELOPMENT IN ALASKA. Peter T. Hanley et al. 1981. 323 pp.

This report reviews administrative roles, authorities, procedures, and decisionmaking processes for oil and gas leasing and post-lease environmental management for both the State and Federal governments. Past and present oil exploration and development efforts in Alaska, and a general assessment of the most promising areas for future exploration are reviewed. Industry practices associated with each phase of petroleum development and their potential effects on fish, wildlife, and habitat are presented.

FWS/OBS-80/22.1. NATURAL RESOURCE PROTECTION AND PETROLEUM DEVELOPMENT IN ALASKA: A SUMMARY. Peter T. Hanley et al. 1981. 39 pp.

A summary of FWS/OBS-80/22.

FWS/OBS-80/23. A HANDBOOK FOR MANAGEMENT OF OIL AND GAS ACTIVITIES ON LANDS IN ALASKA: PETROLEUM INDUSTRY PRACTICES, ENVIRONMENTAL IMPACTS AND STIPULATIONS. Peter T. Hanley, James E. Hemming, and John W. Morsell. 1983. 66 pp.

Presents information on the characteristics and environmental effects of oil and gas development and activities in Alaska. Environmental disturbances and impact mitigation are also discussed. The kinds of information required for the design of effect mitigation measures are included in the final chapter.

FWS/OBS-80/24 and 80/25. Volume I of this 2-volume report provides information on the extent and nature of Eastern surface coal mining; its environmental effects, especially on fish and wildlife; and reclamation efforts. Volume I also discusses PL 95-87, the Surface Mining Law of 1977, outlining its major role, and the roles of other laws in fish and wildlife resource management. Volume II is intended primarily for planners and managers of fish and wildlife resources in connection with various surface coal mining and reclamation activities.

FWS/OBS-80/24. COAL SURFACE MINING RECLAMATION AND FISH AND WILDLIFE RELATIONSHIPS IN THE EASTERN UNITED STATES. VOLUME I: PAST FINDINGS, THE SURFACE MINING LAW OF 1977 (PL 95-87), FUTURE PLANNING AND MANAGEMENT CONSIDERATIONS, AND INFORMATION SOURCES. Daniel L. Leedy. 1981. 75 pp.

FWS/OBS-80/25. COAL SURFACE MINING RECLAMATION AND FISH AND WILDLIFE RELATIONSHIPS IN THE EASTERN UNITED STATES. VOLUME II: OPPORTUNITIES AND APPROACHES FOR FISH AND WILDLIFE PLANNING AND MANAGEMENT IN COAL SURFACE MINING, RECLAMATION AND POSTMINING LAND USE. Daniel L. Leedy and Thomas M. Franklin. 1981. 169 pp.

FWS/OBS-80/26. BIOLOGICAL EVALUATION OF ENVIRONMENTAL IMPACTS - THE PROCEEDINGS OF A SYMPOSIUM. 1980. 237 pp.

The Council on Environmental Quality and the Ecological Society of America sponsored a symposium at 1976 meeting of the American Institute of Biological Sciences. The symposium dealt with the contributions that the science of ecology was bringing to the field of environmental impact assessment, to facilitate exchange of information concerning the present state of impact assessment.

FWS/OBS-80/27. REHABILITATION AND CREATION OF SELECTED COASTAL HABITATS: PROCEEDINGS OF A WORKSHOP. James C. Lewis and Elaine W. Bunce, eds. 1980. 162 pp.

Nineteen papers from workshop at Sapelo Island, Georgia, May 1976. Topics include techniques for creation of salt marshes, sand dunes, and seagrass beds; and rehabilitation of coastal areas.

FWS/OBS-80/28. PROCEEDINGS OF THE CLEMSON WORKSHOP ON ENVIRONMENTAL IMPACTS OF PUMPED STORAGE HYDROELECTRIC OPERATIONS. James P. Clugston, ed. 1980. 206 pp.

Presents the results of a workshop held at Clemson, SC on 15-16 May 1979. Discusses environmental problems associated with the development of pumped-storage hydroelectric facilities. Topics included effects on various aquatic ecosystem components.

FWS/OBS-80/29. AN ECOLOGICAL CHARACTERIZATION OF COASTAL MAINE. Stewart I. Fefer and Patricia A. Schettig. 1980.

Vol. I-III - Overview. v.p.
Vol. IV - Appendices. v.p.
Vol. V - Data Source Appendix. 265 pp.
Vol. VI - Atlas. 18 pp.

Information about the natural resources of coastal Maine north and east of Cape Elizabeth, presented in an ecological framework to help guide resource management decisions and coastal planning and to evaluate human impacts on the ecosystem.

FWS/OBS-80/30. PROCEEDINGS OF THE GULF OF MEXICO COASTAL ECOSYSTEMS WORKSHOP: OFFICE OF ENVIRONMENT, REGION 2, U.S. FISH AND WILDLIFE SERVICE. Paul L. Fore and Russell D. Peterson, eds. 1980. 214 pp.

The purpose of the workshop was to provide information to coastal decisionmakers on recent developments in coastal ecology related to assessing the impact of human activities on fish and wildlife resources. Topics discussed included the permitting process, productivity of seagrasses, contributions of wooded swamps to estuarine productivity, management of barrier islands, oil and gas development in coastal marshes, State and Federal relations in the coastal zone, adaptive environmental assessment, and the ecological role of selected coastal habitats.

FWS/OBS-80/31. SUMMARY PLAN FOR APPLICATION OF COASTAL CHARACTERIZATIONS TO ENERGY-RELATED DEVELOPMENTS. 1980. 9 pp. Not available.

FWS/OBS-80/32. THE DUAL MATRIX AND OTHER ENVIRONMENTAL IMPACT ASSESSMENT METHODS. Joan G. Trial, Linda M. Demion, and Jon G. Stanley. 1980. 54 pp.

Summarizes seven different existing environmental assessment methods, with particular emphasis on the Dual Matrix approach. Methodologies developed by the U.S. Fish and Wildlife Service are included.

FWS/OBS-80/33. HANDLING OF COMBUSTION AND EMISSION-ABATEMENT WASTES FROM COAL-FIRED POWER PLANTS: IMPLICATIONS FOR FISH AND WILDLIFE RESOURCES. Lars F. Soholt et al. 1980. 191 pp.

Coal combustion ashes and flue-gas desulfurization (FGD) sludges, the solid waste products from coal-fired facilities, contain a number of trace elements that can be toxic to biota if they are available in sufficient quantities. Dispersal of constituents from waste-storage sites occurs primarily by runoff, seepage, and wind erosion. This report contains qualitative and quantitative methods for evaluating the potential impacts from these routes of dispersal in site-specific situations.

FWS/OBS-80/34. STRATEGY FOR ASSESSING IMPACTS OF POWER PLANTS ON FISH AND SHELLFISH POPULATIONS. Eugene S. Fritz, Paul J. Rago, and Ishwar P. Murarka. 1980. 79 pp.

Describes a strategy for conducting biological studies to eliminate the acquisition of irrelevant and extraneous data, increase efficiency of data collection, and increase reliability of conclusions related to predicted or measured impacts as applied to all types of developments in any type of environment, terrestrial or aquatic.

FWS/OBS-80/35. PLANNING FOR URBAN FISHING AND WATERFRONT RECREATION. D. L. Leedy, T. M. Franklin, and R. M. Maestro. 1981. 116 pp.

This document is intended to help planners and developers enhance fishing and waterfront recreation in urban areas by preserving existing high-quality aquatic areas, restoring degraded areas, and creating new areas where appropriate. Background information about fish and wildlife values, the nature of aquatic ecosystems, urbanization effects on these systems, planning and management implications, and the importance of aquatic resource considerations in urban-suburban planning are discussed.

FWS/OBS-80/36. PLANNING FOR FISH AND WILDLIFE ON ILLINOIS COAL SURFACE MINES. Edwin E. Herricks et al. 1980.

Working draft. Not published.

FWS/OBS-80/37. CATALOG OF CALIFORNIA SEABIRD COLONIES. Arthur L. Sowls et al. 1980. 371 pp.

Summarizes the location, size, and species composition of seabird colonies along the California coast. More than 260 nesting areas with a total estimated population of nearly 700,000 birds are documented. This information will aid resource planners to evaluate possible effects on seabirds of proposed oil and gas leasing.

FWS/OBS-80/38. VOLCANIC ASH PROBLEMS AND CONCERNS FOR FISH AND WILDLIFE. 1980. 34 pp.

The eruption of Mt. St. Helens prompted this set of observations on the short and long term impacts of volcanic ash on fish, wildlife, and their habitat. It contains information adapted from a manual on the disposal of coal ash and scrubber sludge.

FWS/OBS-80/39. COASTAL AND MARINE BIRD DATA BASE. Stanley H. Anderson, Paul H. Geissler, and Deanna K. Dawson. 1980. 66 pp.

Discusses the development of a coastal and marine bird data base at the Migratory Bird and Habitat Research Laboratory. The system is described and is compared with other data bases. Suggestions for future development, such as adaptations for other taxonomic groups, are included. Examples are given for heron and pelagic bird data which indicate the types of analyses that can be conducted.

FWS/OBS-80/40.1 to 40.17. This ongoing series, entitled "Air Pollution and Acid Rain," is a group of publications relating to the effects of air emissions and acid deposition on fish and wildlife resources. Overviews of a variety of ecosystems and regions are included.

FWS/OBS-80/40.1. EFFECTS OF AIR EMISSIONS ON WILDLIFE RESOURCES. James R. Newman. 1980. 32 pp.

FWS/OBS-80/40.2. POTENTIAL IMPACTS OF LOW PH ON FISH AND FISH POPULATIONS. Eugene S. Fritz. 1980. 17 pp.

FWS/OBS-80/40.3. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - INTRODUCTION. M. A. Peterson. 1982. 198 pp.

FWS/OBS-80/40.4. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - LAKES. M. A. Peterson. 1982. 123 pp.

FWS/OBS-80/40.5. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - RIVERS AND STREAMS. W. Potter and B. K. Chang. 1982. 55 pp.

FWS/OBS-80/40.6. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - FORESTS. L. Borghi. 1982. 90 pp.

FWS/OBS-80/40.7. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - GRASSLANDS. M. A. Peterson. 63 pp.

FWS/OBS-80/40.8. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - ARCTIC TUNDRA AND ALPINE MEADOW. J. E. Olson. 1982. 31 pp.

FWS/OBS-80/40.9. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - DESERTS AND STEPPES. E. N. Mirsky and D. Harper. 1982. 41 pp.

FWS/OBS-80/40.10. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - URBAN ECOSYSTEMS. M. A. Peterson. 1982. 94 pp.

FWS/OBS-80/40.11. THE EFFECTS OF AIR POLLUTION AND ACID RAIN ON FISH, WILDLIFE, AND THEIR HABITATS - CRITICAL HABITATS OF THREATENED AND ENDANGERED SPECIES. M. A. Peterson and D. Adler. 1982. 57 pp.

FWS/OBS-80/40.12. EFFECT OF ACID PRECIPITATION ON AQUATIC RESOURCES: RESULTS OF MODELING WORKSHOPS. 1982. 150 pp.

FWS/OBS-80/40.13. LIMING OF ACIDIFIED WATERS: A REVIEW OF METHODS AND EFFECTS ON AQUATIC ECOSYSTEMS. J. E. Fraser and D. L. Britt. 1982. 189 pp.

FWS/OBS-80/40.14. LIMING OF ACIDIFIED WATERS: ISSUES AND RESEARCH - A REPORT OF THE INTERNATIONAL LIMING WORKSHOP. 1982. 35 pp.

FWS/OBS-80/40.15. A REGIONAL SURVEY OF THE CHEMISTRY OF HEADWATER LAKES AND STREAMS IN NEW ENGLAND: VULNERABILITY TO ACIDIFICATION. Terry A. Haines, John Akielaszek, and Paul Rago. 1983. 157 pp.

FWS/OBS-80/40.16. COMPARATIVE ANALYSES OF FISH POPULATIONS IN NATURALLY ACIDIC AND CIRCUMNEUTRAL LAKES IN NORTHERN WISCONSIN. James G. Wiener. 1983. 107 pp.

FWS/OBS-80/40.17. ROCKY MOUNTAIN ACIDIFICATION STUDY. J. Gibson et al. 1983. 137 pp.

FWS/OBS-80/40.18. EFFECTS OF ACIDIC PRECIPITATION ON ATLANTIC SALMON RIVERS IN NEW ENGLAND. Terry A. Haines and John J. Akielaszek. 1984. 108 pp.

FWS/OBS-80/41. MARINE MAMMALS OF THE SOUTHEASTERN UNITED STATES COAST AND THE GULF OF MEXICO. David J. Schmidly. 1981. 175 pp.

All of the available data from a 1979 study/survey on the distribution and abundance of marine mammals in the study area was synthesized for this report. The information on cetaceans and pinnipeds is presented in two sections: an analysis of observations and individual species accounts. The former compares the frequency of strandings, sightings, and captures for each species each month. The species accounts present distribution, abundance, status, seasonal movements, and life history for 35 species.

FWS/OBS-80/42. RESPONSES OF SUBMERSED VASCULAR PLANT COMMUNITIES TO ENVIRONMENTAL CHANGES: SUMMARY. Graham J. Davis and Mark M. Brinson. 1980. 17 pp.

This is a condensation of a more comprehensive, technical publication by the same authors entitled RESPONSES OF SUBMERSED VASCULAR PLANT COMMUNITIES TO ENVIRONMENTAL CHANGE, FWS/OBS-79/33. Environmental parameters discussed include: light transmission, fluctuating water levels, wave action, sedimentation, nutrients, and seasonal effects. Potential impacts of various developmental activities are discussed briefly.

FWS/OBS-80/43. PROCEEDINGS OF THE FOURTH ANNUAL LARVAL FISH CONFERENCE. Lee A. Fuiman, ed. 1980. 185 pp.

Contains 15 papers and one abstract of presentations made during the conference, held at the University of Mississippi on 27-28 February 1980. Papers deal with larval fish biology, including discussions of taxonomy, distribution, feeding, and growth.

FWS/OBS-80/44. ISSUES IN FISH AND WILDLIFE PLANNING: WATER RESOURCES PLANNING UNDER THE FISH AND WILDLIFE COORDINATION ACT. Karl F. Stutzman. 1980. 56 pp.

This paper briefly discusses the more significant provisions of the Fish and Wildlife Coordination Act (1958). It covers pertinent aspects of legislative history, the development and current status (April 1980) of certain policies relevant to administering the Act, and other matters. It is directed primarily to practicing fish and wildlife agency field biologists, planners, and decisionmakers engaged in water resources development activities under the Act.

FWS/OBS-80/45 to 80/49. This characterization covers an area of approximately 22,500 sq. mi. along the California Coast south of the California-Oregon border. It is an ecological integration of information into one data base including physical-chemical features and processes, biological resources, and socio-economic activities of this coastal region.

FWS/OBS-80/45. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME I: BASIC ECOLOGICAL CONCEPTS. Jones and Stokes Associates, Inc. 1981. 209 pp.

FWS/OBS-80/46.1. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME II, PART 1: REGIONAL CHARACTERIZATION. Jones and Stokes Associates, Inc. 1981. 450 pp.

FWS/OBS-80/46.2. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME II, PART 2: SPECIES. Jones and Stokes Associates, Inc. 1981. 682 pp.

FWS/OBS-80/47.1. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME III, PART 1: HABITATS. Jones and Stokes Associates, Inc. 1981. 473 pp.

FWS/OBS-80/47.2. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME III, PART 2: COMMUNITY. Jones and Stokes Associates, Inc. 1981. 879 pp.

FWS/OBS-80/48. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME IV: WATERSHEDS AND BASINS. Jones and Stokes Associates, Inc. 1981. 1395 pp.

FWS/OBS-80/49. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. VOLUME V: DATA SOURCE APPENDIX. Jones and Stokes Associates, Inc. 1981. 77 pp.

FWS/OBS-80/50. AERIAL SURVEYS FOR MANATEES AND DOLPHINS IN WESTERN PENINSULAR FLORIDA (WITH NOTES ON SIGHTINGS OF SEA TURTLES AND CROCODILES). A. Blair Irvine, John E. Caffin, and Howard I. Kochman. 1981. 21 pp.

Low altitude aerial surveys were conducted at approximately monthly intervals from August to December 1979 to count West Indian manatees (Trichechus manatus) and bottlenose dolphins (Tursiops truncatus) in western peninsular Florida. Sightings of sea turtles, turtle tracks, and a crocodile were also noted.

FWS/OBS-80/51. ATLANTIC COAST - ECOLOGICAL INVENTORY. A. D. Beccasio et al. 1980. 163 pp.

This study provides an inventory of important ecological resources along the Atlantic Coastal Zone, an area of some 196,840 square kilometers (76,000 square miles). This inventory is intended to provide government and industry decisionmakers with valuable ecological information which will assist in the regional siting of oil- and gas-processing and manufacturing facilities and their respective transportation systems. Ecological resources are summarized by their appropriate geographic zone, and descriptions and locations of species with special status and aquatic and terrestrial species of high commercial, recreational, and aesthetic value are included.

FWS/OBS-80/52. Number not used.

FWS/OBS-80/53. INSTREAM FLOW NEGOTIATION: REVIEW OF PRACTICES. Mary Ray White, Felix D. Valdez, and Michael D. White. 1980. 50 pp.

The different approaches to negotiations as they apply to managing instream flows are reviewed in this report. Negotiations are comprised of many factors, including debate, persuasion, cooperation, and compromise.

FWS/OBS-80/54. AVIAN MORTALITY AT MAN-MADE STRUCTURES: AN ANNOTATED BIBLIOGRAPHY (REVISED). Michael L. Avery, Paul F. Springer, and Nancy S. Dailey. 1980. 155 pp.

This bibliography provides references to studies of bird mortality due to collisions with man-made structures. Radio and TV towers, buildings, power lines, and cooling towers are some of the structures considered. This updates the original bibliography, FWS/OBS-78/55.

FWS/OBS-80/55. STREAMSIDE AREAS - MANAGEMENT DIVIDENDS. Michelle Nolde et al. 1980. 16 pp.

This nontechnical publication is aimed at stimulating interest among ranchers and landowners in improving streamside zones. It emphasizes the importance of streamside zones for fish, wildlife, and domestic livestock, and the interrelationship of those resources. Agencies that can assist landowners in developing management plans, and funding sources for implementation of the plans are also listed.

FWS/OBS-80/56. IMPACTS OF URANIUM MINING AND MILLING UPON THE FISH AND WILDLIFE RESOURCES OF THE NEW MEXICO SAN JUAN BASIN REGION. Scott C. Meneely, Steven L. Duzan, and Sanford D. Schemnitz. 1979. 159 pp.

This report identifies fish and wildlife species on Indian lands within the San Juan Basin of New Mexico, Arizona, and Colorado. Impacts of uranium milling and mining at existing and proposed mine sites are identified, and recommendations for mitigation measures were included.

FWS/OBS-80/57. PROCEEDINGS OF THE URANIUM MINING AND MILLING WORKSHOP. Gerald C. Horak and James E. Olson. 1980. 105 pp.

The proceedings summarize a two-day workshop held on 28-29 May 1980. Participants from government agencies and the private sector presented information on their involvement with uranium development. Recommendations for Fish and Wildlife Service initiatives related to uranium development were presented and ranked.

FWS/OBS-80/58. FIELD GUIDELINES FOR USING TRANSECTS TO SAMPLE NONGAME BIRD POPULATIONS. Sharon A. Mikol. 1980. 60 pp.

Field procedures are discussed for line transect sampling to estimate the abundance of nongame birds. The methods are oriented toward habitats and species in the Northern Great Plains, but much of the information is applicable to any habitat or species. Problems in data collection are emphasized.

FWS/OBS-80/59. PROCEEDINGS: U.S. FISH AND WILDLIFE SERVICE WORKSHOP ON COASTAL ECOSYSTEMS OF THE SOUTHEASTERN UNITED STATES. Robert C. Carey, Paul S. Markovits, and James B. Kirkwood. 1981. 269 pp.

This workshop was held on Big Pine Key, Florida, from 18-22 February 1980. Its purpose was to provide training on recent developments in understanding coastal eocystems in the Southeast for FWS field personnel and other natural resource managers in the region. Major emphasis was given to three types of ecosystems: marshes; mangroves; and sea grasses.

FWS/OBS-80/60. WINTER FISH POPULATIONS IN PROBABLE LOCATIONS OF AIR BUBBLERS IN THE ST. MARY'S RIVER-LAKE SUPERIOR AREA. Michael D. Dahlberg, James W. Duncan, and John M. Burke. 1980. 50 pp. plus Appendices.

A winter (1979-1980) survey was conducted of fish, benthic macroinvertebrates and selected physicochemical parameters at five bubbler sites proposed for the St. Marys River and Whitefish Bay. Two bibliographies were also prepared and are included as appendices to this report. Subjects were: "Ecological effects of air bubblers in the winter, a partially annotated bibliography" and "Annotated bibliography on winter fish and macrobenthos communities of St. Marys River, Lake Superior, and Lake Huron."

FWS/OBS-80/61. Number not used.

FWS/OBS-80/62. ENVIRONMENTAL BASELINE AND EVALUATION OF THE ST. MARY'S RIVER DREDGING. Charles R. Liston et al. 1980. 295 pp.

The purpose of this study was to gather pre-dredging (baseline) physical, chemical, and biological data at both the proposed dredging site and disposal area. Objectives of the study were to: (1) sample aquatic flora and fauna; (2) sample water and sediments to determine chemical and physical parameters; (3) relate aquatic flora and fauna to physical and chemical data; (4) predict what dredging effects might be; (5) document unique or important habitats; and (6) identify dominant or important flora and fauna of the study area.

FWS/OBS-80/62.1. SUPPLEMENTARY ENVIRONMENTAL BASELINE STUDIES AND EVALUATION OF THE ST. MARY'S RIVER DURING 1980. Charles R. Liston et al. 1981. v.p.

This data supplements similar information published in FWS/OBS-80/62.

FWS/OBS-80/63. Number not used.

FWS/OBS-80/64. ENHANCEMENT OF FISH AND WILDLIFE RESOURCES IN THE RECLAMATION OF HARD ROCK MINED LANDS IN THE UPPER MIDWEST: A GUIDELINES MANUAL. Barr Engineering Co., Bather-Ringrose-Wolsfeld-Jarvis-Gardner, Inc., and J. P. Borovsky. 1980. 131 pp.

Identifies the state of the art in current mineland reclamation practices in the Upper Midwest, particularly in the development of fish and wildlife habitat. Designed to encourage inclusion of wildlife habitat enhancement considerations in the reclamation planning process.

FWS/OBS-80/65. EFFECTS OF PEAT MINING ON FISH AND OTHER AQUATIC ORGANISMS IN THE UPPER MIDWEST. Camp, Dresser and McKee, Inc. 1981. 72 pp.

This study reviews the literature pertinent to peatlands and peat mining in order to determine the effects of peat mining on aquatic animal life. The paper proposes to describe the peatland aquatic habitat and fauna, to compare existing and proposed peat mining techniques in light of peat mining possibilities for alternate energy sources, to suggest possible mitigation of undesirable effects, and to identify important data gaps in the literature.

FWS/OBS-80/66. Number not used.

FWS/OBS-80/67. A GUIDE FOR ENHANCEMENT OF FISH AND WILDLIFE ON ABANDONED MINE LANDS IN THE EASTERN UNITED STATES. J. R. Nawrot, A. Woolf, and W. D. Klimstra. 1982. 100 pp.

The guide is intended to promote the incorporation of fish and wildlife habitat enhancement into the reclamation of abandoned mine lands under the provisions of the Surface Mining Control and Reclamation Act of 1977 (Title IV, PL 95-87). The primary audience is State reclamation planners, but the guide is also useful to State natural resources agencies, the Office of Surface Mining, and the Fish and Wildlife Service.

FWS/OBS-80/68. BEST CURRENT PRACTICES FOR FISH AND WILDLIFE ON SURFACE-MINED LANDS IN THE EASTERN INTERIOR COAL REGION. E. E. Herricks et al. 1981. 212 pp.

Developed to aid surface coal mine operators in identifying and implementing the best current practices (BCPs) for protecting and improving fish and wildlife resources on their minesite during both the active coal extraction and postmining phases of their operation. The area of concern is the Illinois Coal Basin, comprised by the States of Illinois, western Indiana, and western Kentucky. Technical references listed at the end of each practice provide background and theory from which the techniques were developed.

FWS/OBS-80/69. CHESAPEAKE BAY CHARACTERIZATION STUDY PLANS. Not available (NCET).

FWS/OBS-81/01. THE ECOLOGY OF NEW ENGLAND TIDAL FLATS: A COMMUNITY PROFILE. Robert B. Whitlatch. 1982. 125 pp.

Provides a general perspective of tidal flats of New England, the organisms commonly associated with them, and the importance of tidal flats to the coastal zone viewed as a whole. Each chapter discusses a component of the tidal flats ecosystem, and incorporates the published information available at the time of writing. The last chapter (Chapter 6) considers the response of tidal flats to environmental perturbation as well as their value to the New England coastal zone.

FWS/OBS-81/02. FISH AND WILDLIFE RESOURCES OF THE GREAT LAKES COASTAL WETLANDS WITHIN THE UNITED STATES. Ohio State University. 1980.

Vol. 1:	Overview. 480 pp.
Vol. 2:	Lake Ontario. 1351 pp.
Vol. 3:	Lake Erie. 530 pp.
Vol. 4:	Lake Huron. 834 pp.
Vol. 5:	Lake Michigan. 1676 pp.
Vol. 6:	Lake Superior. 901 pp.

A total of 1,370 coastal wetlands were identified along the U.S. coast of the Great Lakes. Each is identified and topography, soils, hydrology, climate, biotic setting, and cultural setting are used to describe the wetlands. Lists of flora and fauna are included.

FWS/OBS-81/03. WILLAPA BAY: A HISTORICAL PERSPECTIVE AND A RATIONALE FOR RESEARCH. Joel W. Hedgepath and Steven Obrebski. 1981. 52 pp.

The purpose of this report is to suggest information that will be valuable in planning for the management of the aquatic resources of the bay. The effects of logging and other land use practices in the basin are taken into account.

FWS/OBS-81/04. PROCEEDINGS OF NATIONAL SYMPOSIUM ON FRESHWATER INFLOW TO ESTUARIES. Ralph D. Cross and Donald L. Williams, eds. 1981. 1053 pp.

This 2-volume proceedings includes 76 papers on the institutional and management problems of providing freshwater inflow to estuaries, ecological effects of modifying freshwater inflow, and suggested measures to bring freshwater inflow into water planning. The problems of freshwater inflow include reduction in volume due to inland water diversions, modification of seasonal flow regimes, reduction in water quality, and alteration of sediment and nutrient content. Freshwater inflow problems were identified in Raritan Bay, Chesapeake Bay, southern Florida, the Gulf of Mexico, San Francisco Bay, and the Columbia River estuary.

FWS/OBS-81/05. COAL COMBUSTION WASTE MANUAL: EVALUATING IMPACTS TO FISH AND WILDLIFE. Lars F. Soholt et al. 1981. 151 pp.

With the anticipated accelerated use of coal as an energy source, a concomitant increase can be expected in the potential for impacts to fish and wildlife resources. The goal of this manual is to provide quantitative guidelines, where possible, for evaluating the potential extent of habitat disturbance from waste constituent dispersal. Criteria are also provided for evaluating the potential for impact from trace elements in the waste.

This manual is designed to be used in conjunction with FWS/OBS-80/33.

FWS/OBS-81/06. ATLAS OF COAL/MINERALS AND IMPORTANT RESOURCE PROBLEM AREAS FOR FISH AND WILDLIFE IN THE CONTERMINOUS UNITED STATES. Robert A. Honig, Richard J. Olson, and William T. Mason, Jr. 1981. 107 pp.

The atlas highlights areas of potential concern involving coal and minerals development activities and fish and wildlife resources, in particular the Important Resource Problem Areas (IRPs) designated in 1980 by the U.S. Fish and Wildlife Service as areas of emphasis in policy-making. The atlas serves as an initial screening tool for national and regional planners and administrators to help define areas that may require additional analysis prior to development in order to minimize disturbances and adverse impacts on fish and wildlife resources and to protect and enhance these resources where practicable.

FWS/OBS-81/07. PLAYA LAKES SYMPOSIUM PROCEEDINGS. 1981. 136 pp.

This report represents the proceedings of the Playa Lakes Symposium sponsored by the U.S. Fish and Wildlife Service in Arlington, Texas in December 1979. Twelve papers are included covering topics in playa resources development, playa lakes ecology, impacts of playa modification, and authorities and responsibilities for playa resources. The papers provide a broad overview of the playa lakes issue from the Federal, State, and private perspectives and outline the elements essential to consider in any management plan for that resource.

FWS/OBS-81/08. UTILIZATION OF SURFACE MINE PONDS IN EAST TENNESSEE BY BREEDING AMPHIBIANS. Linda J. Turner and Dale K. Fowler. 1981. 20 pp.

Breeding amphibians were found in 21 of 24 ponds examined on the Ollis Creek Surface Mine in Campbell County, Tennessee. Twelve species of amphibians were identified in ponds that range from 4.0 to 8.0 in pH. Although ponds with low pH values were used by breeding amphibians, significantly more amphibian species were found in ponds with higher pH values. Findings indicated high biological productivity in the surface mine ponds examined.

FWS/OBS-81/09. SURFACE MINE RECLAMATION FOR WILDLIFE: A MODEL RECLAMATION PLAN FOR SOUTHERN APPALACHIA. Dale K. Fowler, Linda J. Turner, and Lawrence J. Slaski. 1981. 30 pp.

A reclamation plan for use on surface coal mines in southern Appalachia is presented. Included are suggestions relative to the establishment of groundcover and trees and the retention of surface water on mine sites. All techniques mentioned in the plan benefit wildlife and will assist the operator in achieving bond release. This plan has been implemented cooperatively by TVA and the FWS on a mine site in Campbell County, Tennessee.

FWS/OBS-81/10. Number not used.

FWS/OBS-81/11. NATIONAL COASTAL ECOLOGICAL RESEARCH: EXISTING AND PROPOSED ENERGY DEVELOPMENTS. Sharon L. Gordon, Herbert L. Lundblad, and Carol A. Westcott. 1981. 158 pp.

The purpose of this National Coastal Ecological Research report was to compile existing information about energy developments in the coastal zone. Information was gathered on existing and proposed energy developments in order to allow some assessment of future impacts in the coastal zone from energy-related developments.

FWS/OBS-81/12. AN ANNOTATED BIBLIOGRAPHY OF LITERATURE ON ALASKA WATER BIRDS. Colleen M. Handel et al. 1981. 515 pp.

This annotated bibliography contains 1,554 citations of published and unpublished references on water birds in Alaska. References which either report on field studies conducted in Alaska or deal specifically with ornithology in Alaska have been included. The content of each paper has been summarized and indexed by subject, species, and geographic location. The bibliography is divided into four sections: seabirds; waterfowl and other water birds; shorebirds; and avifauna.

FWS/OBS-81/13. DISTRIBUTION AND ABUNDANCE OF MARINE BIRDS AND MAMMALS IN THE KODIAK AREA OF ALASKA. Douglas J. Forsell and Patrick J. Gould. 1981. 81 pp.

Forty-four species of seabirds and ten species of marine mammals were observed during the winter of 1979-1980 in the Kodiak Archipelago. The species composition of seabirds in the area shifted considerably between summer and winter. Prime habitats for seabirds wintering in the Kodiak area include ice-free estuaries and lagoons for puddle ducks; marine waters less than 25 m deep with rock substrates for seaducks; and waters near the 100-m isobath in mid-bay for murres.

FWS/OBS-81/14. Number not used.

FWS/OBS-81/15. THE ECOLOGY OF INTERTIDAL OYSTER REEFS OF THE SOUTH ATLANTIC COAST: A COMMUNITY PROFILE. Leonard M. Bahr and William P. Lanier. 1981. 105 pp.

The functional role of the intertidal oyster reef community in the southeastern Atlantic coastal zone is described. The profile is organized in a hierarchical manner. Relevant details of reef oyster biology (autecology) are presented, followed by a description of the reef community level of organization. Then the reef community is described as a subsystem of the coastal marsh-ecosystem (synecology). The final chapter includes a summary overview and a section on management implications and guidelines.

FWS/OBS-81/16. MISSISSIPPI DELTAIC PLAIN REGION ECOLOGICAL CHARACTERIZATION: AN ECOLOGICAL ATLAS. Donald Garofalo. 1982. 96 pp. and 72 maps.

See abstract on p. 36.

FWS/OBS-81/17. RIPARIAN ECOSYSTEMS: THEIR ECOLOGY AND STATUS. M. M. Brinson et al. 1981. 154 pp.

This report is a comprehensive review and synthesis of information on the ecological values of riparian ecosystems. Chapters are included on the following topics: status of riparian ecosystems in the U.S.; ecological functions and properties of riparian ecosystems; importance of riparian ecosystems to fish and wildlife; and considerations in valuation (ecologic and economic) of riparian ecosystems. The report is a technical summary of extensive literature reviews and personal communications with Federal and State agencies.

FWS/OBS-81/18. Number not used.

FWS/OBS-81/19. Number not used.

FWS/OBS-81/20. Number not used.

FWS/OBS-81/21. Number not used.

FWS/OBS-81/22. MANAGING OIL AND GAS ACTIVITIES IN COASTAL ENVIRONMENTS: REFUGE MANUAL. W. L. Longley, R. Jackson, and B. Snyder. 1981. 466 pp.

This report documents the management of oil and gas development on national wildlife refuges on the Louisiana and Texas coasts. It explains the nature of ownership, leasing rights, and legal considerations related to oil and gas extraction on refuges. The report describes five Federal refuges selected for analysis and the different marsh and estuarine ecosystems found on the refuges and in the coastal zone. It explains oil and gas extraction and transport methods used in coastal systems, and examines how each habitat is affected by these activities.

FWS/OBS-81/23. Number not used.

FWS/OBS-81/24. THE ECOLOGY OF THE MANGROVES OF SOUTH FLORIDA: A COMMUNITY PROFILE. William E. Odum, Carole C. McIvor, and Thomas J. Smith, III. 1982. 154 pp.

A detailed description is given of the community structure and ecosystem processes of the mangrove forests of south Florida based upon a compilation of data and hypotheses from published and unpublished sources. Information covered ranges from details of mangove distribution, primary production, and diseases to aspects of reproduction, biomass partitioning, and adaptations to stress. Mangrove ecosystems are considered in terms of zonation, succession, litter fall and decomposition, carbon export, and energy flow.

FWS/OBS-81/25. REVEGETATING SURFACE MINED LANDS FOR WILDLIFE IN TEXAS AND OKLAHOMA. Kenneth L. Dickson and Dwain Vance. 1981. 120 pp.

This guide includes procedures and discussions encouraging the preservation and reclamation of surface mined lands in Texas and Oklahoma for wildlife. Even on those sites where reclamation will be oriented primarily toward agricultural purposes (e.g., tame pasture, commercial forest, etc.), there are numerous ways to include wildlife in the reclamation plan. Methods and procedures are recommended that will promote diversity in habitats to attract and support wildlife.

FWS/OBS-81/26. IMPACT OF STREAM ALTERATION AND GRAZING ON RIPARIAN COMMUNITIES IN IOWA. L. B. Best et al. 1981. 54 pp.

The purpose of this study was to determine the effects of short-reach stream channelization on land-use practices and the impacts of these effects on riparian plant and animal communities. Changes in land use were relatively minor with small declines in herbaceous fields and pastures and increases in cultivated crops. Bird and small mammal use of riparian land was closely correlated to the availability of forests and woodlands.

FWS/OBS-81/27. AN ECOSYSTEM ANALYSIS OF OIL AND GAS DEVELOPMENT ON THE TEXAS-LOUISIANA CONTINENTAL SHELF. Benny J. Gallaway. 1981. 97 pp.

The Texas-Louisiana shelf ecosystem in the Gulf of Mexico is described in terms of its physiographic, oceanographic, and biological characteristics and as an area of oil and gas development activities and effluents. Data from most field studies indicate that direct effects are limited in space, but the effects over time are unknown. Future research should be directed towards defining key processes governing the ecosystem, with modeling workshops serving as the focus for these research and monitoring programs.

FWS/OBS-81/28. Number not used.

FWS/OBS-81/29. ECOREGIONS OF NORTH AMERICA. R. G. Bailey and C. T. Cushwa. 1981. 1 p.

Ecoregions of North America are described, as defined by their distinctive climates, vegetation, and soils. Regions are divided into three ecologic levels which are number-coded for fish and wildlife, and analysis and data management.

FWS/OBS-81/30. PACIFIC COAST ECOLOGICAL INVENTORY: USER'S GUIDE AND INFORMATION BASE. Angelo D. Beccasio et al. 1981. 159 pp.

Thirty fish and wildlife coastal inventory maps were prepared to provide energy facility planners and industry officials with assistance and guidance in their plans for environmental protection. The maps reduce the potential for conflict by depicting areas or resources that are ecologically or economically valuable and that could be most vulnerable to the construction and operation of energy facilities.

FWS/OBS-81/31. REACH FILE PHASE II REPORT: A STANDARDIZED METHOD FOR CLASSIFYING STATUS AND TYPE OF FISHERIES. James E. Olson, Elizabeth A. Whippo, and Gerald C. Horak. 1981. n.p.

The Reach File is a computerized catalog of the hydrological features of the United States. The file will organize and analyze water resources data and provide interpreted information concerning physical, chemical, and biological attributes of the cataloged river reaches. The objective of Phase II was to design a standardized system for collecting information related to the type and quality of fisheries in the cataloged reaches.

FWS/OBS-81/32. TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION: ENVIRONMENTAL SYNTHESIS PAPERS. Dale M. Shew et al. 1981. 413 pp.

This report is a synthesis of selected environmental literature for the Texas Barrier Islands Region and is a part of the Texas Barrier Islands Region Ecological Characterization Study. The Texas Barrier Islands Region is defined to include the coastal counties and extends 64 km inland and offshore to the State-Federal demarcation. These papers deal with six drainage basins along the Texas coast, and address the geology, climate, hydrology and hydrography, and the biology of each basin.

FWS/OBS-81/33. BIOLOGICAL AND ECONOMIC IMPACT OF STREAM ALTERATION IN THE VIRGINIA PIEDMONT. J. B. Whelan et al. 1981. 46 pp.

This study was designed to determine the effects of stream channelization on the aquatic/riparian fish and wildlife resources of selected warmwater streams in the Virginia Piedmont. Changing land-use patterns and the economic costs and benefits of the channelization projects were also analyzed. Variations in fish and bird species diversity among channelized and unchannelized streams was discussed.

FWS/OBS-81/34. OIL SHALE: ITS DEVELOPMENT AND POTENTIAL FOR AIR QUALITY EFFECTS. L. Soholt and S. Wiedenbaum. 1981. 62 pp.

The development of western oil shales is expected to expand dramatically over the next several decades in order to provide sources of liquid fuels as alternatives to conventional petroleum. This document provides the biologist an overview of the oil shale extraction and processing, the regulatory context, the sources and nature of atmospheric emissions, and the potential toxicity of oil shale emissions.

FWS/OBS-81/35. Number not used.

FWS/OBS-81/36. PILOT STUDY OF THE MARINE MAMMALS, BIRDS, TURTLES IN OCS AREAS OF THE GULF OF MEXICO. Thomas H. Fritts and Robert P. Reynolds. 1981. 150 pp.

The report discusses techniques for collecting data on marine animals in OCS areas. Aerial surveys of mammals, birds, and turtles were conducted in four study sites in the Gulf of Mexico, at altitudes of 91 and 228 m, in August and December 1979. Weather and physical factors, altitude, distance, depth, observer bias, species, and species group size are analyzed as potential sources of error in aerial surveys.

FWS/OBS-81/37. THE ECOLOGY OF BOTTOMLAND HARDWOOD SWAMPS OF THE SOUTHEAST: A COMMUNITY PROFILE. Charles H. Wharton et al. 1982. 133 pp.

This report synthesizes extant literature detailing the ecology of bottomland hardwoods in the floodplains of rivers whose drainages originate in the Appalachian Mountains/Piedmont and Coastal Plain (NC, SC, GA, and FL). The origin and dynamics of the floodplains are described and related to hydrology and physiographic provinces. Plant and animal community structure and ecological processes (productivity) are described and organized by ecological zones.

FWS/OBS-81/38. AN ASSESSMENT OF WETLAND HABITAT ESTABLISHMENT AT A CENTRAL FLORIDA PHOSPHATE MINE SITE. T. Gilbert, T. King, and B. Barnett. 1981. 111 pp.

This study was conducted to assess feasibility of reclaiming wetland habitats to partially mitigate long term adverse impacts on fish and wildlife populations of phosphate mining. Current reclamation practices do not restore habitat values and regional habitat diversity associated with pre-mining native environments.

FWS/OBS-81/39.1 to 81/39.3. These reports synthesize existing literature and survey data for birds in several States. Their objectives are to summarize available bird population data for major habitat types, to indicate how changes in habitat influence population trends, and to suggest techniques for managing bird diversity and abundance in various habitat types.

FWS/OBS-81/39.1. HABITAT MANAGEMENT FOR BIRDS OF PENNSYLVANIA. S. H. Anderson, C. S. Robbins, and J. R. Partelow. 1981. 52 pp.

FWS/OBS-81/39.2. HABITAT MANAGEMENT FOR BIRDS OF WEST VIRGINIA. S. H. Anderson, C. S. Robbins, and J. R. Partelow. 1981. 49 pp.

FWS/OBS-81/39.3. HABITAT MANAGEMENT FOR BIRDS OF ALABAMA. S. H. Anderson, C. S. Robbins, and J. R. Partelow. 1981. 58 pp.

FWS/OBS-81/40.1 to 81/40.3. These data remain unpublished. See FWS/OBS-81/39.1 to 81/39.3 for information.

FWS/OBS-81/40.1. SYNTHESIS AND EVALUATION OF AVIAN POPULATION AND HABITAT DATA FOR PENNSYLVANIA.

FWS/OBS-81/40.2. SYNTHESIS AND EVALUATION OF AVIAN POPULATION AND HABITAT DATA FOR WEST VIRGINIA.

FWS/OBS-81/40.3. SYNTHESIS AND EVALUATION OF AVIAN POPULATION AND HABITAT DATA FOR ALABAMA.

FWS/OBS-81/41. ALABAMA COASTAL REGION ECOLOGICAL CHARACTERIZATION. VOLUME 3: A SOCIOECONOMIC STUDY. J. H. Friend et al. 1982. 367 pp.

The socioeconomic study consists of nine topics discussing the social and economic climate of coastal Alabama. These nine topics are: social and demographic characteristics; industrial and residential development; agricultural production; minerals production; commercial fishing; transportation; recreation/tourism industry; multiple use conflicts; and environmental issues and regulations. Also included is an extensive appendix containing tabular data supporting the discussions.

FWS/OBS-81/42. Number not used.

FWS/OBS-81/43 (REVISED). USER'S GUIDE TO THE PHYSICAL HABITAT SIMULATION SYSTEM. Robert T. Milhous, David L. Wegner, and Terry J. Waddle. 1981. 254 pp.

The manual contains instructions and guidelines for using the Physical Habitat Simulation System (PHABSIM) developed by the Instream Flow Group, USFWS. The PHABSIM system simulates the physical habitat in relation to flow regime and physical structure of a stream and has been applied to water management and fisheries management. The manual contains specific descriptions of the theory and organization of the computer programs making up PHABSIM. Appendix material contains directions for use of particular programs or for specialized applications of the programs.

FWS/OBS-81/44. FEASIBILITY OF USING GEOTHERMAL EFFLUENTS FOR WATERFOWL WETLANDS. CH_2M Hill. 1981. 236 pp.

The feasibility of using geothermal effluent water to develop and maintain waterfowl wetlands was evaluated. The study area encompassed Idaho, Montana, Nevada, New Mexico, Northern California, Oregon, and Utah. Physical and chemical properties of effluent water were described for 206 sites in the seven States. Potential use of the sites for wetlands was evaluated. Sites with the most development potential are in the Beaverhead area, the Camas area of Idaho, and the Nye area of Nevada.

FWS/OBS-81/45. BEST CURRENT PRACTICES FOR FISH AND WILDLIFE ON SURFACE-MINED LAND IN THE NORTHERN APPALACHIAN COAL REGION. Karl E. Ohlsson et al. 1982. 305 pp.

This document was developed to aid surface coal mine operators in identifying and implementing the best current practices (BCP's) for protecting and improving fish and wildlife resources on their minesite during both the active coal extraction and postmining phases of their operation. Information about best current practices was identified then compiled and presented in a form compatible with the needs of the operators so that they can directly incorporate the procedures into their mining and reclamation activities.

FWS/OBS-81/46. DESCRIPTION AND APPLICATION OF THE STREAM SIMULATION AND ASSESSMENT MODEL VERSION IV (SSAM IV). William J. Grenney and Andrezejk Kraszewski. 1981. v.p.

The purpose of this report is to describe the mathematical model, the Stream Simulation and Assessment Model (SSA), used to introduce water quality aspects into the Instream Flow Group's Incremental Methodology (IFIM). This document is intended for use by aquatic biologists and water quality engineers who are experienced in water quality studies, and who need a water quality computer model.

FWS/OBS-81/47. ESTIMATING WILDLIFE HABITAT VARIABLES. Robert L. Hays, Cliff Summers, and William Seitz. 1981. 111 pp.

Thirty-five techniques for estimating variables commonly used as input to habitat models for terrestrial wildlife species are described. Each description includes explicit directions for use, and information about required equipment, cost to apply, accuracy, and conditions under which it is appropriate to be used. A glossary of variables is included, and cross-referenced to the appropriate techniques.

FWS/OBS-81/48. PROCEEDINGS: WORKSHOP ON DOWNSTREAM RIVER CHANNEL CHANGES RESULTING FROM DIVERSIONS OR RESERVOIR CONSTRUCTION. D. B. Simons et al. 1981. 353 pp.

This workshop assembled 20 qualified individuals to discuss solutions to downstream problems stemming from hypothetical impoundments or diversions, or both, on three selected rivers in the West. The proceedings of the workshop are composed of results prepared by the 20 participants along with reporters' comments and workshop summaries. These reports describe how the authors perceive the problem of river response and determine a solution to a set of hypothetical man-induced changes.

FWS/OBS-81/49. FLORIDA ATLAS OF BREEDING SITES FOR HERONS AND THEIR ALLIES: 1976-78. S. A. Nesbitt et al. 1982. 455 pp.

The first atlas of heron colonies was published in 1978 (Osborn and Custer 1978) and covered the Atlantic coast from Maine to Florida for 1975 and 1976. This atlas is an update of heron colonies for the Atlantic coast of Florida and an initial heron colony coverage for the Florida gulf coast and inland colonies, 1976 through 1978. Aerial surveys were conducted in April and mid-summer over the Florida peninsula, east of the Ochlockonee River. A total of 295 active nesting colonies, with 22 different species, were located in the 3-year period.

FWS/OBS-81/50. RARE, THREATENED, AND ENDANGERED PLANT SPECIES OF SOUTHWEST FLORIDA AND POTENTIAL OCS ACTIVITY IMPACTS. Earl D. McCoy. 1981. 93 pp.

This report on rare, threatened, and endangered plants of southwest Florida is a compilation of all species so designated or considered for listing by Federal, State, and private agencies or organizations. The most serious potential affects of Outer Continental Shelf (OCS) oil development activities on plants would result from oil spills. Under certain unfavorable conditions, offshore spills could adversely affect concentrations of coastal plants in predicted landfall areas.

FWS/OBS-81/51. LIFE HISTORY REQUIREMENTS OF SELECTED FINFISH AND SHELLFISH IN MISSISSIPPI SOUND AND ADJACENT AREAS. Norman G. Benson, eds. 1982. 104 pp.

The published and unpublished literature on spawning, nursery, and migratory requirements of 41 finfish and shellfish species in Mississippi Sound, Mobile Bay and adjacent waters was synthesized to assist the U.S. Army Corps of Engineers in planning dredging activities for navigation. Species were selected because of high abundance or significant value for recreational or commercial fishing.

FWS/OBS-81/52. MATAGORDA BAY, TEXAS: ITS HYDROGRAPHY, ECOLOGY, AND FISHERY RESOURCES. George H. Ward, Jr. 1980. 230 pp.

This is the final report for Phase I of a projected 3-year study of Matagorda Bay. It is a compilation and synthesis of available information on the hydrography and ecology of the Matagorda Bay system. Further information needs are also discussed.

FWS/OBS-81/53. Number not used.

FWS/OBS-81/54. THE ECOLOGY OF SOUTHERN CALIFORNIA COASTAL SALT MARSHES: A COMMUNITY PROFILE. Joy B. Zedler. 1982. 110 pp.

Southern California coastal wetlands are small and disturbed. Management problems include continuing development, reduced tidal circulation, depauperate species lists, and the need to create marsh communities on newly exposed substrates. The constraints of hypersaline soils, scarce sources of propagules, and poor establishment ability of southern California halophytes make marsh enhancement a slow and difficult process.

FWS/OBS-81/55. THE ECOLOGY OF THE NEW ENGLAND HIGH SALT MARSHES: A COMMUNITY PROFILE. Scott W. Nixon. 1982. 70 pp.

High marshes have been subjected to man's activities since earliest English settlement. The history of New Englanders' impact on this community is traced from their use of marshes as hay fields to depositories of pollutants. Habitat management considerations today include mosquito control and sewage sludge treatment.

FWS/OBS-82/01. MARINE BIRDS OF THE SOUTHEASTERN UNITED STATES AND GULF OF MEXICO. PART I: GAVIIFORMES THROUGH PELECANIFORMES. R. B. Clapp et al. 1982. 637 pp.

This report describes the distribution, abundance, habitat, food habits and other aspects of the life history, and susceptability to oil, of 39 species of marine birds of the order Gaviiformes, Podicipediformes, Procellariiformes, or Pelecaniformes in the southeastern Atlantic and Gulf of Mexico. Winter distribution maps for the more common species and breeding range maps for the species that nest in the coastal southeastern U.S. and in the Gulf are presented. An extensive, chronological bibliography accompanies each species account.

FWS/OBS-82/02. MANAGING OIL AND GAS ACTIVITIES IN COASTAL ENVIRONMENTS: COMPREHENSIVE REPORT. William L. Longley, Rodney Jackson, and Bruce Snyder. 1982. 839 pp.

This report documents the management of oil and gas development on wildlife refuges along the Louisiana and Texas coasts. Guidelines, standards, and stipulations imposed on development activities in these areas are analyzed. Methods for determining environment impacts are also described.

FWS/OBS-82/03. RARE, THREATENED, AND ENDANGERED VERTEBRATES OF SOUTHWEST FLORIDA AND POTENTIAL OCS ACTIVITY IMPACTS. Glen E. Woolfenden. 1983. 64 pp.

Habitat preferences of 68 rare, threatened, or endangered vertebrate species are described, along with information on species distribution, reproduction, feeding, and population estimates. Outer Continental Shelf (OCS) development activities contributing to the decline of these 68 vertebrates are assessed; loss of usable habitat is considered to be the most significant problem.

FWS/OBS-82/04. THE ECOLOGY OF SOUTHEASTERN SHRUB BOGS (POCOSINS) AND CAROLINA BAYS: A COMMUNITY PROFILE. Rebecca R. Sharitz and J. Whitfield Gibbons. 1982. 93 pp.

This describes the ecology of pocosins and Carolina bays, including information on geology, soils, floral and faunal species composition, and other attributes. Impacts of land use changes on these bogs and bays, e.g., forestry and agricultural clearage, are also discussed.

FWS/OBS-82/05. ECOLOGY OF APALACHICOLA BAY: ESTUARINE PROFILE. In preparation (NCET).

FWS/OBS-82/06. ECOLOGY OF PAMILICO RIVER ESTUARY: ESTUARINE PROFILE. B. J. Copeland, Ronald G. Hodson, and Stanley R. Riggs. 1984. 83 pp.

The Pamilico River estuary in eastern North Carolina serves as an important nursery ground for a number of migratory fish species as well as shrimp and blue crabs. It is a major tributary to Pamilico Sound, the primary estuarine fishing ground of the State. Impacts of large-scale drainage activities and nutrient inputs on this fishery are among the issues facing managers of the estuary's resources.

FWS/OBS-82/07. Number not used.

FWS/OBS-82/08. CORAL REEFS OF SOUTHERN FLORIDA: A COMMUNITY PROFILE. In preparation (NCET).

FWS/OBS-82/09. ECOREGION, LAND-SURFACE FORM, AND HYDROLOGIC UNIT MAPS OF THE U.S. Robert T. Bailey and Charles T. Cushwa, compilers. 1982. 3 maps.

Maps included are: "Ecoregions and land-surface forms of the United States", "Hydrologic Unit Map of the United States", and "Hydrologic Unit Map of Alaska and Hawaii."

FWS/OBS-82/10, 82/10.A, and 82/10.1 to 82/10.62. This is a series of publications describing habitat requirements of selected fish and wildlife species. Numerous literature sources have been consulted in an effort to consolidate scientific data on species-habitat relationships. These data have subsequently been synthesized into subjective Habitat Suitability Index (HSI) models. The models are based on suitability indices formulated for variables found to affect the life cycle and survival of each species. The models are designed to be modified to evaluate specific habitat alterations using the HSI model building techniques presented in the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures.

FWS/OBS-82/10. HABITAT SUITABILITY INDEX MODELS: INTRODUCTION. Melvin L. Schamberger, Adrian H. Farmer, and James W. Terrell. 1982. 2 pp.

FWS/OBS-82/10.A. HABITAT SUITABILITY INDEX MODELS: APPENDIX A. GUIDELINES FOR RIVERINE AND LACUSTRINE APPLICATIONS OF FISH HSI MODELS WITH THE HABITAT EVALUATION PROCEDURES. James W. Terrell et al. 1982. 54 pp.

FWS/OBS-82/10.1. HABITAT SUITABILITY INDEX MODELS: COASTAL STOCKS OF STRIPED BASS. Mark B. Bain and Jane L. Bain. 1982. 29 pp.

FWS/OBS-82/10.2. HABITAT SUITABILITY INDEX MODELS: CHANNEL CATFISH. Thomas E. McMahon and James W. Terrell. 1982. 29 pp.

FWS/OBS-82/10.3A. HABITAT SUITABILITY INDEX MODELS: A LOW EFFORT SYSTEM FOR PREDICTING HABITAT SUITABILITY OF PLANNED COOLWATER AND COLDWATER RESERVOIRS (REVISED). William J. McConnell, Eric P. Bergersen, and Kathryn L. Williamson. 1984. 47 pp.

A technique is described for measuring reservoir habitat suitability based on a composite score for five primary reservoir attributes (temperature, turbidity, nonliving cover, drawdown, and shallow cover frequency). The value of each primary attribute is determined from secondary attributes, which are easily obtained from published data or on-site inspection of the proposed reservoir basin. Subsequently, the use of primary attribute scores to determine reservoir habitat suitability for five selected fish species is described. The intended use is during the early planning stages of reservoir construction projects, when the outcomes of alternative plans are being evaluated.

FWS/OBS-82/10.4. HABITAT SUITABILITY INDEX MODELS: CREEK CHUB. Thomas E. McMahon. 1982. 23 pp.

FWS/OBS-82/10.5. HABITAT SUITABILITY INDEX MODELS: CUTTHROAT TROUT. Terry J. Hickman and Robert F. Raleigh. 1982. 38 pp.

FWS/OBS-82/10.6. HABITAT SUITABILITY INDEX MODELS: BLACK CRAPPIE. Elizabeth A. Edwards et al. 1982. 25 pp.

FWS/OBS-82/10.7. HABITAT SUITABILITY INDEX MODELS: WHITE CRAPPIE. Elizabeth A. Edwards et al. 1982. 22 pp.

FWS/OBS-82/10.8. HABITAT SUITABILITY INDEX MODELS: BLUEGILL. Robert J. Stuber, Glen Gebhart, and O. Eugene Maughan. 1982. 26 pp.

FWS/OBS-82/10.9. HABITAT SUITABILITY INDEX MODELS: SLOUGH DARTER. Elizabeth A. Edwards, Mary Bacteller, and O. Eugene Maughan. 1982. 13 pp.

FWS/OBS-82/10.10. HABITAT SUITABILITY INDEX MODELS: FERRUGINOUS HAWK. Thomas M. Jasikoff. 1982. 18 pp.

FWS/OBS-82/10.11. HABITAT SUITABILITY INDEX MODELS: PINE MARTEN. Arthur W. Allen. 1982. 9 pp.

FWS/OBS-82/10.12. HABITAT SUITABILITY INDEX MODELS: COMMON CARP. Elizabeth A. Edwards and K. Twomey. 1982. 27 pp.

FWS/OBS-82/10.13. HABITAT SUITABILITY INDEX MODELS: SMALLMOUTH BUFFALO. Elizabeth A. Edwards and K. Twomey. 1982. 28 pp.

FWS/OBS-82/10.14. HABITAT SUITABILITY INDEX MODELS: BLACK BULLHEAD. Robert J. Stuber. 1982. 25 pp.

FWS/OBS-82/10.15. HABITAT SUITABILITY INDEX MODELS: GREEN SUNFISH. Robert J. Stuber. 1982. 28 pp.

FWS/OBS-82/10.16. HABITAT SUITABILITY INDEX MODELS: LARGEMOUTH BASS. Robert J. Stuber, Glen Gebhart, and O. Eugene Maughan. 1982. 32 pp.

FWS/OBS-82/10.17. HABITAT SUITABILITY INDEX MODELS: NORTHERN PIKE. Peter D. Inskip. 1982. 40 pp.

FWS/OBS-82/10.18. HABITAT SUITABILITY INDEX MODELS: FOX SQUIRREL. Arthur W. Allen. 1982. 11 pp.

FWS/OBS-82/10.19. HABITAT SUITABILITY INDEX MODELS: GRAY SQUIRREL. Arthur W. Allen. 1982. 11 pp.

FWS/OBS-82/10.20. HABITAT SUITABILITY INDEX MODELS: JUVENILE SPOT. Robert R. Stickney and Michael L. Cuenco. 1982. 12 pp.

FWS/OBS-82/10.21. HABITAT SUITABILITY INDEX MODELS: JUVENILE ATLANTIC CROAKER. Robert J. Diza. 1982. 22 pp.

FWS/OBS-82/10.22. HABITAT SUITABILITY INDEX MODELS: VEERY. Patrick J. Sousa. 1982. 12 pp.

FWS/OBS-82/10.23. HABITAT SUITABILITY INDEX MODELS: GULF MENHADEN. J. Y. Christmans. 1982. 23 pp.

FWS/OBS-82/10.24. HABITAT SUITABILITY INDEX MODELS: BROOK TROUT. Robert F. Raleigh. 1982. 42 pp.

FWS/OBS-82/10.25. HABITAT SUITABILITY INDEX MODELS: REGRESSION MODELS BASED ON HARVEST OF COOLWATER AND COLDWATER FISHES IN RESERVOIRS. Larry R. Aggus and William M. Bivin. 1982. 38 pp.

This report presents methods designed to permit habitat classification of reservoirs that contain coolwater, coldwater, and seasonal two-story fisheries. Multiple regression equations describing relations between reservoir environmental characteristics and biomass harvest of selected sport fish species or groups are presented. Cumulative frequency plots of known harvest estimates from the various classes of reservoirs are presented to facilitate conversion of harvest predictions to Habitat Suitability Indices (HSI's). Detailed descriptions and limitations of the procedures are discussed.

FWS/OBS-82/10.26. HABITAT SUITABILITY INDEX MODELS: YELLOW-HEADED BLACKBIRD. Richard L. Schroeder. 1982. 11 pp.

FWS/OBS-82/10.27. HABITAT SUITABILITY INDEX MODELS: YELLOW WARBLER. Richard L. Schroeder. 1982. 7 pp.

FWS/OBS-82/10.28. HABITAT SUITABILITY INDEX MODELS: PINE WARBLER. Richard L. Schroeder. 1982. 7 pp.

FWS/OBS-82/10.29. HABITAT SUITABILITY INDEX MODELS: EASTERN MEADOWLARK. Richard L. Schroeder and Patrick J. Sousa. 1982. 9 pp.

FWS/OBS-82/10.30 (Revised). HABITAT SUITABILITY INDEX MODELS: BEAVER. Arthur W. Allen. 1983. 19 pp.

FWS/OBS-82/10.31. HABITAT SUITABILITY INDEX MODELS: SOUTHERN KINGFISH. Walter B. Sikora and Jean Pantell Sikora. 1982. 22 pp.

FWS/OBS-82/10.32. HABITAT SUITABILITY INDEX MODELS: LEWIS' WOODPECKER. Patrick J. Sousa. 1983. 14 pp.

FWS/OBS-82/10.33. HABITAT SUITABILITY INDEX MODELS: LONGNOSE DACE. Elizabeth A. Edwards. 1983. 13 pp.

FWS/OBS-82/10.34. HABITAT SUITABILITY INDEX MODELS: BIGMOUTH BUFFALO. Elizabeth A. Edwards. 1983. 23 pp.

FWS/OBS-82/10.35. HABITAT SUITABILITY INDEX MODELS: LONGNOSE SUCKER. Elizabeth A. Edwards. 1983. 21 pp.

FWS/OBS-82/10.36. HABITAT SUITABILITY INFORMATION: SMALLMOUTH BASS. Elizabeth A. Edwards, Glen Gebhart, and O. Eugene Maughan. 1983. 47 pp.

FWS/OBS-82/10.37. HABITAT SUITABILITY INDEX MODELS: BLACK-CAPPED CHICKADEE. Richard L. Schroeder. 1983. 12 pp.

FWS/OBS-82/10.38. HABITAT SUITABILITY INDEX MODELS: DOWNY WOODPECKER. Richard L. Schroeder. 1983. 10 pp.

FWS/OBS-82/10.39. HABITAT SUITABILITY INDEX MODELS: PILEATED WOODPECKER. Richard L. Schroeder. 1983. 15 pp.

FWS/OBS-82/10.40. HABITAT SUITABILITY INFORMATION: COMMON SHINER. James G. Trial et al. 1983. 22 pp.

FWS/OBS-82/10.41. HABITAT SUITABILITY INFORMATION: BLACKNOSE DACE. James G. Trial et al. 1983. 26 pp.

FWS/OBS-82/10.42. HABITAT SUITABILITY INDEX MODELS: SOUTHERN RED-BACKED VOLE (WESTERN UNITED STATES). Arthur W. Allen. 1983. 14 pp.

FWS/OBS-82/10.43. HABITAT SUITABILITY INDEX MODELS: WOOD DUCK. Patrick J. Sousa and Adrian H. Farmer. 1983. 27 pp.

FWS/OBS-82/10.44. HABITAT SUITABILITY INDEX MODELS: BAIRD'S SPARROW. Patrick J. Sousa and W. Neil McDonal. 1983. 12 pp.

FWS/OBS-82/10.45. HABITAT SUITABILITY INDEX MODELS: FISHER. Arthur W. Allen. 1983. 19 pp.

FWS/OBS-82/10.46. HABITAT SUITABILITY INDEX MODELS: MUSKRAT. Arthur W. Allen. In prep.

FWS/OBS-82/10.47. HABITAT SUITABILITY INDEX MODELS: WILLIAMSON'S SAPSUCKER. Patrick J. Sousa. 1983. 13 pp.

FWS/OBS-82/10.48. HABITAT SUITABILITY INFORMATION: FALLFISH. James G. Trial. 1983. 15 pp.

FWS/OBS-82/10.49. HABITAT SUITABILITY INDEX MODELS: COHO SALMON. Thomas E. McMahon. 1983. 29 pp.

FWS/OBS-82/10.50. HABITAT SUITABILITY INDEX MODELS: ROSEATE SPOONBILL. James C. Lewis. 1983. 16 pp.

FWS/OBS82/10.51. HABITAT SUITABILITY INDEX MODELS: CLAPPER RAIL. James C. Lewis. 1983. 15 pp.

FWS/OBS-82/10.52. HABITAT SUITABILITY INDEX MODELS: MOTTLED DUCK. James C. Rorabaugh and Phillip J. Zwank. 1983. 26 pp.

FWS/OBS-82/10.53. HABITAT SUITABILITY INDEX MODELS: REDHEAD (WINTERING). Rebecca J. Howard and Harold A. Kantrud. 1983. 14 pp.

FWS/OBS-82/10.54. HABITAT SUITABILITY INDEX MODELS: NORTHERN GULF OF MEXICO BROWN SHRIMP AND WHITE SHRIMP. R. Eugene Turner and Michael S. Brody. 1983. 24 pp.

FWS/OBS-82/10.55. HABITAT SUITABILITY INFORMATION: YELLOW PERCH. Douglas A. Krieger, James W. Terrell, and Patrick C. Nelson. 1983. 37 pp.

FWS/OBS-82/10.56. HABITAT SUITABILITY INFORMATION: WALLEYE. Thomas E. McMahon, James W. Terrell, and Patrick C. Nelson. 1984. 43 pp.

FWS/OBS-82/10.57. HABITAT SUITABILITY INDEX MODELS: GULF OF MEXICO AMERICAN OYSTER. Edwing W. Cake, Jr. 1983. 37 pp.

FWS/OBS-82/10.58. HABITAT SUITABILITY INDEX MODELS: ALEWIFE AND BLUEBACK HERRING. Garland B. Pardue. 1983. 22 pp.

FWS/OBS-82/10.59. HABITAT SUITABILITY INDEX MODELS: LITTLENECK CLAM. Kenneth Rodnick and Hiram W. Li. 1983. 15 pp.

FWS/OBS-82/10.60. HABITAT SUITABILITY INFORMATION: RAINBOW TROUT. Robert F. Raleigh et al. 1984. 63 pp.

FWS/OBS-82/10.61. HABITAT SUITABILITY INDEX MODELS: MINK. Arthur W. Allen. 1983. 19 pp.

FWS/OBS-82/10.62. HABITAT SUITABILITY INDEX MODELS: FIELD SPARROW. Patrick J. Sousa. 1983. 14 pp.

FWS/OBS-82/10.63. HABITAT SUITABILITY INDEX MODELS: BLACK BRANT. Richard L. Schroeder. 1984. 11 pp.

FWS/OBS-82/10.64. HABITAT SUITABILITY INDEX MODELS AND INSTREAM FLOW SUITABILITY CURVES: WHITE SUCKER. Kathleen A. Twomey, Kathryn L. Williamson, and Patrick C. Nelson. 1984. 56 pp.

FWS/OBS-82/10.65. HABITAT SUITABILITY INDEX MODELS: PRONGHORN. Arthur W. Allen, John G. Cook, and Michael J. Armbruster. 1984. 22 pp.

FWS/OBS-82/10.66. HABITAT SUITABILITY INDEX MODELS: EASTERN COTTONTAIL. Arthur W. Allen. 1984. 28 pp.

FWS/OBS-82/10.67. HABITAT SUITABILITY INDEX MODELS: WARMOUTH. Thomas E. McMahon, Glen Gebhart, and O. Eugene Maughan. 1984. 20 pp.

FWS/OBS-82/10.68. HABITAT SUITABILITY INDEX MODELS: BLACK DUCK. James C. Lewis and Russell L. Garrison. 1984. 16 pp.

FWS/OBS-82/10.69. HABITAT SUITABILITY INDEX MODELS: WESTERN GREBE. Henry L. Short. 1984. 20 pp.

FWS/OBS-82/10.70. HABITAT SUITABILITY INDEX MODELS: THE ARIZONA GUILD AND LAYERS OF HABITAT MODELS. Henry L. Short. 1984. 36 pp.

FWS/OBS-82/10.71. HABITAT SUITABILITY INDEX MODELS AND INSTREAM FLOW SUITABILITY CURVES: BROWN TROUT. Robert F. Raleigh, Lawrence D. Zuckerman, and Patrick C. Nelson. 1984. 71 pp.

FWS/OBS-82/10.72. HABITAT SUITABILITY INDEX MODELS AND INSTREAM FLOW SUITABILITY CURVES: SPOTTED BASS. 1984. 41 pp.

FWS/OBS-82/10.73. Model published in new Biological Report series.

FWS/OBS-82/10.74. HABITAT SUITABILITY INDEX MODELS: LARVAL AND JUVENILE RED DRUM. Jack Buckley. 1984. 15 pp.

FWS/OBS-82/10.75. HABITAT SUITABILITY INDEX MODELS: SPOTTED SEATROUT. Paul T. Kostecki. 1984. 22 pp.

FWS/OBS-82/10.76. HABITAT SUITABILITY INDEX MODELS: PINK SHRIMP. Rosemarie Mulholland. 1984. 17 pp.

FWS/OBS-82/10.77. HABITAT SUITABILITY INDEX MODELS: HARD CLAM. Rosemarie Mulholland. 1984. 21 pp.

FWS/OBS-82/10.78. HABITAT SUITABILITY INDEX MODELS: GREAT EGRET. Brian R. Chapman and Rebecca J. Howard. 1984. 23 pp.

FWS/OBS-82/10.79. HABITAT SUITABILITY INDEX MODELS AND INSTREAM FLOW SUITABILITY CURVES: REDEAR SUNFISH. Kathleen A. Twomey and Patrick C. Nelson. 1984. 29 pp.

FWS/OBS-82/10.80. HABITAT SUITABILITY INDEX MODELS AND INSTREAM FLOW SUITABILITY CURVES: PADDLEFISH. Wayne A. Hubert, Stanley H. Anderson, Peter D. Southall, and Johnie H. Crance. 1984. 32 pp.

FWS/OBS-82/10.81. HABITAT SUITABILITY INDEX MODELS: BLUE GROUSE. Richard L. Schroeder. 1984. 20 pp.

FWS/OBS-82/10.82. HABITAT SUITABILITY INDEX MODELS: CANVASBACK. Richard L. Schroeder. 1984. 16 pp.

FWS/OBS-82/10.83. HABITAT SUITABILITY INDEX MODELS: BREWER'S SPARROW. Henry L. Short. 1984. 16 pp.

FWS/OBS-82/10.84. HABITAT SUITABILITY INDEX MODELS: LAKE TROUT. Michael D. Marcus, Wayne A. Hubert, and Stanley H. Anderson. 1984. 12 pp.

FWS/OBS-82/10.85. HABITAT SUITABILITY INDEX MODELS: STRIPED BASS. Thomas E. McMahon, Glen Gebhart, O. Eugene Maughan, and Patrick C. Nelson. 1984. 41 pp.

*FWS/OBS-82/11.1 to 82/11.21. This series is entitled "Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates." It contains summaries of the life histories and environmental requirements of selected coastal fishes and invertebrates of commercial, recreational, or ecological significance. The Profiles will be used to relate life history and environmental requirements of species to coastal water quality models and to assist in evaluating the environmental impacts of altering estuarine habitats. These studies were conducted in cooperation with the U.S. Army Corps of Engineers.

FWS/OBS-82/11.1. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS (GULF OF MEXICO): BROWN SHRIMP. Dennis R. Lassuy. 1983. 15 pp.

FWS/OBS-82/11.2. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS (GULF OF MEXICO): GULF MENHADEN. Dennis R. Lassuy. 1983. 13 pp.

FWS/OBS-82/11.3. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS (GULF OF MEXICO): ATLANTIC CROAKER. Dennis R. Lassuy. 1983. 12 pp.

FWS/OBS-82/11.4. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS (GULF OF MEXICO): SPOTTED SEATROUT. Dennis R. Lassuy. 1983. 14 pp.

FWS/OBS-82/11.5. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (GULF OF MEXICO): SEA CATFISH AND GAFFTOPSAIL CATFISH. Robert J. Muncy and William M. Wingo. 1983. 17 pp.

FWS/OBS-82/11.6. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (PACIFIC NORTHWEST): CHINOOK SALMON. David A. Beauchamp, Michael F. Shepard, and Gilbert B. Pauley. 1983. 15 pp.

FWS/OBS-82/11.7. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (NORTH ATLANTIC): WHITE PERCH. Jon G. Stanley and Dwight S. Danie. 1983. 12 pp.

FWS/OBS-82/11.8. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (MID-ATLANTIC): STRIPED BASS. Clemon W. Fay, Richard J. Neves, and Garland B. Pardue. 1983. 36 pp.

FWS/OBS-82/11.9. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (MID-ATLANTIC): ALEWIFE/BLUEBACK HERRING. Clemon W. Fay, Richard J. Neves, and Garland B. Pardue. 1983. 25 pp.

FWS/OBS-82/11.10. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (MID-ATLANTIC): ATLANTIC SILVERSIDE. Clemon W. Fay, Richard J. Neves, and Garland B. Pardue. 1983. 15 pp.

FWS/OBS-82/11.11. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH ATLANTIC): ATLANTIC MENHADEN. S. Gordon Rogers and Michael J. Van Den Avyle. 1983. 20 pp.

FWS/OBS-82/11.12. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (MID-ATLANTIC): BAY SCALLOP. Clemon W. Fay, Richard J. Neves, and Garland B. Pardue. 1983. 17 pp.

FWS/OBS-82/11.13. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (MID-ATLANTIC): SURF CLAM. Clemon W. Fay, Richard J. Neves, and Garland B. Pardue. 1983. 23 pp.

FWS/OBS-82/11.14. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (GULF OF MEXICO): BAY ANCHOVY AND STRIPED ANCHOVY. H. Randall Robinette. 1983. 15 pp.

FWS/OBS-82/11.15. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH ATLANTIC): SUMMER FLOUNDER. S. Gordon Rogers and Michael J. VanDen Avyle. 1983. 14 pp.

FWS/OBS-82/11.16. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH FLORIDA): SNOOK. William Seaman, Jr. and Mark Collins. 1983. 16 pp.

FWS/OBS-82/11.17. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH FLORIDA): PINK SHRIMP. Lourdes M. Bielsa, William H. Murdich, and Ronald F. Labisky. 1983. 20 pp.

FWS/OBS-82/11.18. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (NORTH ATLANTIC): HARD CLAM. Jon G. Stanley and Rachael DeWitt. 1983. 19 pp.

FWS/OBS-82/11.19. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH ATLANTIC): BLUE CRAB. Michael J. VanDen Avyle and Dean L. Fowler. 1984. 16 pp.

FWS/OBS-92/11.20. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (GULF OF MEXICO): WHITE SHRIMP. In preparation (NCET).

FWS/OBS-82/11.21. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH FLORIDA): STONE CRAB. William J. Lindberg and Michael J. Marshall. 1984. 17 pp.

FWS/OBS-82/11.22. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (NORTH ATLANTIC): ATLANTIC SALMON. Dwight S. Danie, Joan G. Trial, and Jon G. Stanley. 1984. 19 pp.

FWS/OBS-82/11.23. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (NORTH ATLANTIC): AMERICAN OYSTER. Mark A. Sellers and Jon G. Stanley. 1984. 15 pp.

FWS/OBS-82/11.24. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH ATLANTIC): AMERICAN EEL. Michael J. Van Den Avyle. 1984. 20 pp.

FWS/OBS-82/11.25. SPECIES PROFILES: LIFE HISTORIES AND ENVIRONMENTAL REQUIREMENTS OF COASTAL FISHES AND INVERTEBRATES (SOUTH ATLANTIC): ATLANTIC STURGEON. Michael J. Van Den Avyle. 1984. 17 pp.

FWS/OBS-82/12. USER'S GUIDE TO COASTAL FISH: A COMPUTERIZED DATABASE ON FINFISH AND SHELLFISH. MS/AL VERSION 1: MISSISSIPPI SOUND AND MOBILE BAY. Brenda Jones and Norman Benson. 1982. 133 pp.

This database includes information on 41 species of finfish and shellfish in Mississippi Sound and Mobile Bay (Mississippi and Alabama). It was prepared to assist in environmental planning, particularly planning related to placement of dredge spoil materials.

FWS/OBS-82/13.1 to 82/13.3. The three publications in this series discuss water intake structures and their effects on aquatic ecosystems, including entrainment and impingement.

FWS/OBS-82/13.1. PROCEDURE FOR DEVELOPING BIOLOGICAL INPUT FOR THE DESIGN, LOCATION OR MODIFICATION OF WATER INTAKE STRUCTURES. D. A. Neitzel and D. H. McKenzie. 1982. 83 pp.

FWS/OBS-82/13.2. EVALUATION OF MODELS FOR DEVELOPING BIOLOGICAL INPUT FOR THE DESIGN AND LOCATION OF WATER INTAKE STRUCTURES. M. A. Simmons and D. H. McKenzie. 1982. 28 pp.

FWS/OBS-82/13.3. A GUIDANCE MANUAL FOR THE INPUT OF BIOLOGICAL INFORMATION TO WATER INTAKE STRUCTURE DESIGN. D. A. Neitzel, M. A. Simmons, and D. H. McKenzie. 1982. 37 pp.

FWS/OBS-82/14. Number not used.

FWS/OBS-82/15 to 82/17. These reports present descriptive explanations of data presented on 16 maps (maps not available from NTIS) produced at a scale of 1:100,000 for the Texas Barrier Islands region from the eastern end of East Bay, Chambers County, Texas, to the Texas-Mexico border. Socioeconomic and natural features and mineral, oil, gas, and biological resources are included.

FWS/OBS-82/15. TEXAS BARRIER ISLANDS REGIONAL ATLAS: SOCIOECONOMIC AND NATURAL FEATURES NARRATIVE. Clarissa T. Kimber, Kenneth L. White, and Fred S. Hendricks. 1984. 73 pp.

FWS/OBS-82/16. TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION ATLAS: BIOLOGICAL RESOURCES NARRATIVE. J. B. Johnston, compiler.

FWS/OBS-82/17. TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION ATLAS: MINERAL RESOURCES AND SELECTED OIL AND GAS INFRASTRUCTURES NARRATIVE. Clarissa T. Kimber, Kenneth L. White, and Fred S. Hendricks. 1984. 85 pp.

FWS/OBS-82/18. HANDBOOK FOR PROTECTION OF FISH AND WILDLIFE FROM CONSTRUCTION OF FARM AND FOREST ROADS: BEST MANAGEMENT PRACTICES FOR BUILDING ACTIVITIES ASSOCIATED WITH THE DISCHARGE OF DREDGED OR FILL MATERIAL. James Hynson et al. 1982. 185 pp.

This handbook describes 54 best management practices which may be utilized by Federal and States agencies or private landowners and operators in the planning, construction, and maintenance of farm and forest roads. Best management practices (BMP's) for planning road and facility layout and design, erosion control, construction and maintenance operations, and restorations to natural conditions, identified through existing State water quality management plans and management practices of Federal agencies, were evaluated as to their environmental, institutional, technical, and economical effectiveness.

FWS/OBS-82/19. Number not used.

FWS/OBS-82/20. MARINE BIRDS OF THE SOUTHEASTERN UNITED STATES AND GULF OF MEXICO. PART II: ANSERIFORMES. R. B. Clapp, D. Morgan-Jacobs, and R. C. Banks. 1982. 504 pp.

This report describes the distribution, abundance, habitat, food habits and other aspects of the life history, and susceptibility to oil of 41 species of waterfowl of the order Anseriformes in the southeastern Atlantic and Gulf of Mexico. Winter distribution maps for the more common species are presented. An extensive, chronological bibliography accompanies each species account. The report is a planning tool for Federal and State agencies and private companies dealing with oil impacts in coastal waters.

FWS/OBS-82/21. ALABAMA COASTAL REGION ECOLOGICAL CHARACTERIZATION. VOLUME I: COASTAL BIBLIOGRAPHY. P. E. O'Neil et al. 1982. 408 pp.

The primary goal of the Coastal Bibliography is to provide a comprehensive data base to potential users of Alabama's coastal areas and resources. The bibliography is comprised of published and unpublished studies that describe the socioeconomic structure and environmental setting of coastal Alabama. Bibliographic data were organized into a standardized format and indexed by keywords. These data were placed on computer tape and are managed using a computer-base information storage and retrieval system known as FAMULUS. Bibliographic entries may be retrieved by author and keywords.

FWS/OBS-82/22. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME IX: ALASKA. Lyndon C. Lee, Robert O. Teskey, and Thomas M. Hinckley. 1982. 212 pp.

This literature review synthesizes information on the effects of water level changes on riparian and wetland plants in Alaska. Unlike other volumes in this series, this report contains information not only on woody plants, but also on perennial graminoids and other herbaceous species common to Alaskan wetlands. As in other volumes, information is included on species tolerance to inundation. Other parameters regulating growth are also discussed, including: cold temperatures; oxygen demand; and nitrogen requirements. See also series abstract on p. 20.

FWS/OBS-82/23. IMPACT OF WATER LEVEL CHANGES ON WOODY RIPARIAN AND WETLAND COMMUNITIES. VOLUME X: INDEX AND ADDENDUM TO VOLUMES I-VIII. Roberta J. Chapman et al. 1982. 111 pp.

This report provides the user with a summary and a general reference document for Volumes I-VIII of the Fish and Wildlife Service series on Impact of Water Level Changes on Woody Riparian and Wetland Communities. (See series abstract on p. 20.) This index provides the reader with a summary of the earlier volumes, a list of new literature, excerpts of pertinent recent findings, and a list of errors in preceding volumes.

FWS/OBS-82/24. MANUAL OF STREAM ALTERATION IMPACTS ON FISH AND WILDLIFE. P. W. Simpson et al. 1982. 166 pp.

This manual contains a synthesis of the diverse literature dealing with the effects of stream channelization on fish and wildlife resources. Major topics include: (1) regulatory history of stream channelization; (2) structural, physical, and chemical impacts of channelization; and (3) biological impacts of channelization.

FWS/OBS-82/25. THE ECOLOGY OF THE SEAGRASSES OF SOUTH FLORIDA: A COMMUNITY PROFILE. J. C. Zieman. 1982. 150 pp.

A detailed description is given of the community structure and processes of the seagrass ecosystems of south Florida. This description is based upon a compilation of information from numerous published and unpublished sources. The material covered includes distribution, systematics, physiology, and growth of the plants, as well as succession and community development. Emphasis is given to the functional role of seagrass communities in the overall coastal marine system.

FWS/OBS-82/26. A GUIDE TO STREAM HABITAT ANALYSIS USING THE INSTREAM FLOW INCREMENTAL METHODOLOGY. IFIP NO. 12. Ken D. Bovee. 1982. 248 pp.

This manuscript consists of two parts. Part I describes the methodological design, project scoping and site selection procedures, analytical sequences to solve various instream flow and project impact problems, and the various techniques for compiling, displaying, and interpreting the results of a study. Part II contains techniques for assembling hydrological data and anticipating channel changes due to a change in flow regime or sediment yield, methods of simulating physical microhabitat conditions at different streamflows, and an overview of channel modifications to increase habitat availability.

FWS/OBS-82/27. THE ECOLOGY OF PETROLEUM PLATFORMS IN THE NORTHWESTERN GULF OF MEXICO: A COMMUNITY PROFILE. Benny J. Gallaway and George S. Lewbel. 1982. 91 pp.

This coastal habitat profile describes the structure and ecological function of petroleum platforms in the northwestern Gulf of Mexico. The effects of discharges from active platforms on the ecosystem are described.

FWS/OBS-82/28. Number not used.

FWS/OBS-82/29. GROWING COLORADO PLANTS FROM SEED: A STATE OF THE ART. VOLUME II: GRASSES AND GRASSLIKE PLANTS. Timothy E. Fulbright, Edward F. Redente, and Norman E. Hargis. 1982. 113 pp.

This report summarizes published information concerning seed procurement, pretreatment, laboratory germination and cultural practices for growing native and naturalized species of grass in Colorado. Also included are literature citations, a list of Colorado grasses that have been evaluated by the USDA Soil Conservation Service Plant Materials Centers, a list of varieties and cultivars released by the plant materials centers, and addresses of plant materials centers in the West. (Volume III is FWS/OBS-82/30. Volume I was published by the U.S. Forest Service.)

FWS/OBS-82/30. GROWING COLORADO PLANTS FROM SEED: A STATE OF THE ART. VOLUME III: FORBS. Edward F. Redente, Phillip R. Ogle, and Norman E. Hargis. 1982. 141 pp.

This report summarizes published information concerning seed procurement, pretreatment, laboratory germination and cultural practices for growing 442 native and naturalized forb species in Colorado. Also included are 199 literature citations, a list of Colorado forbs that have been evaluated by USDA Soil Conservation Service Plant Materials Centers, and addresses of plant materials centers in the West. (Volume II is FWS/OBS-82/29. Volume I was published by the U.S. Forest Service.)

FWS/OBS-82/31. MAPS OF DISTRIBUTION AND ABUNDANCE OF SELECTED SPECIES OF BIRDS ON UNCULTIVATED NATIVE UPLAND GRASSLANDS AND SHRUBSTEPPE IN THE NORTHERN GREAT PLAINS. Harold A. Kantrud. 1982. 31 pp.

Recent information on areas of abundance of some important species of avifauna which use grasslands is included in this report. The study area includes portions of Montana, Wyoming, Colorado, North Dakota, South Dakota, and Nebraska. Twenty distribution maps for individual species are included.

FWS/OBS-82/32. THE ECOLOGY OF TIDAL MARSHES OF THE PACIFIC NORTHWEST COAST: A COMMUNITY PROFILE. Denise M. Seliskar and John L. Gallagher. 1983. 65 pp.

A conceptual model of functional groups within the tidal marshes of the Pacific Northwest, and a model depicting interactions between the marshes and adjacent ecosystems are presented.

FWS/OBS-82/33 to 82/35, 83/02, 83/07, 83/18, and 83/20 to 83/22. This series of publications, focusing on selected western and midwestern States, provides a survey of State prerogatives which may be used, or have been used, to protect instream uses of water. Fish and wildlife uses of instream flows are emphasized. Many of the publications also cover use of instream flows for hydroelectric power production, recreation, navigation, downstream delivery, and waste load assimilation. These reports provide overviews of potential opportunities for preserving instream flows within the context of existing State laws and regulations.

FWS/OBS-82/33. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN ALASKA. Mary Ray White. 1982. 30 pp.

FWS/OBS-82/34. PROTECTING INSTREAM FLOWS IN CALIFORNIA: AN ADMINISTRATIVE CASE STUDY. IFIP NO. 14. Stewart W. Olive. 1982. 32 pp.

FWS/OBS-82/35. PROTECTING INSTREAM FLOWS IN IDAHO: AN ADMINISTRATIVE CASE STUDY. IFIP NO. 15. Stewart W. Olive. 1982. 30 pp.

FWS/OBS-82/36. MANAGEMENT OF COOLING PONDS AND LAKES FOR FISH AND WILDLIFE - A GUIDANCE MANUAL. J. P. Clugston, D. H. Barwick, and T. T. Fendley. 1982. 68 pp.

This manual discusses management techniques for enhancing fish and wildlife communities at planned and existing cooling lakes. A special section highlights powerplant-induced problems that may affect management strategies.

FWS/OBS-82/37. EFFECTS OF PETROLEUM ON THE DEVELOPMENT AND SURVIVAL OF MARINE TURTLE EMBRYOS. Thomas H. Fritts and M. Angela McGehee. 1982. 41 pp. Not available.

FWS/OBS-82/38. FISH RADIOTELEMETRY: THEORY AND APPLICATION FOR HIGH CONDUCTIVITY RIVERS. Harold M. Tyus. 1982. 26 pp.

Theoretical and applied information about radiotelemetry related to rivers with high conductivity is presented in this report. Theoretical information is presented in a simplified form for investigators new to the radiotelemetry field. Radiotelemetry and ultrasonics are compared as methods for obtaining information about fish movements in turbulent, turbid river systems.

FWS/OBS-82/39.1 to 82/39.3. These publications describe a computer code used to simulate fast-transient, 3-dimensional flow conditions in aquatic environments. This code is designed to assess entrainment and impingement losses at power plants.

FWS/OBS-82/39.1. HYDROL: VOLUME I: DOCUMENTATION AND USER'S MANUAL. Kenneth H. Kim. 1982. 111 pp. Not available.

FWS/OBS-82/39.2. HYDROL: VOLUME II: FLOW DIAGRAMS. Kenneth H. Kim. 1982. 252 pp. Not available.

FWS/OBS-82/39.3. HYDROL: VOLUME III: COMPUTER LISTING, EXAMPLE INPUT AND OUTPUT. Kenneth H. Kim. 1982. 258 pp. Not available.

FWS/OBS-82/40.1 to 82/40.3. The computer code described in these publications is to be used to simulate fast-transient, 3-dimensional flow, temperature, and salinity conditions in aquatic environments. It can assess the water quality impact of power plant operations.

FWS/OBS-82/40.1. THERMA: VOLUME I: DOCUMENTATION AND USER'S MANUAL. Kenneth H. Kim. 1982. 124 pp. Not available.

FWS/OBS-82/40.2. THERMA: VOLUME II: FLOW DIAGRAMS. Kenneth H. Kim. 1982. 252 pp. Not available.

FWS/OBS-82/40.3. THERMA: VOLUME III: COMPUTER LISTING, EXAMPLE INPUT AND OUTPUT. Kenneth H. Kim. 1982. 315 pp. Not available.

FWS/OBS-82/41.1 to 82/41.3. These three volumes describe a computer code for simulating fast-transient, 3-dimensional concentrations of biota in aquatic environments for the assessment of entrainment and impingement losses at power plants.

FWS/OBS-82/41.1. AQUBIO: VOLUME I: DOCUMENTATION AND USER'S MANUAL. Kenneth H. Kim. 1982. 123 pp. Not available.

FWS/OBS-82/41.2. AQUBIO: VOLUME II: FLOW DIAGRAMS. Kenneth H. Kim. 1982. 252 pp. Not available.

FWS/OBS-82/41.3. AQUBIO: VOLUME III: COMPUTER LISTING, EXAMPLE INPUT AND OUTPUT. Kenneth H. Kim. 1982. 285 pp. Not available.

FWS/OBS-82/42. ALABAMA COASTAL REGION ECOLOGICAL CHARACTERIZATION. VOLUME 2: A SYNTHESIS OF ENVIRONMENTAL DATA. P. E. O'Neil and M. F. Metter, eds. 1982. 346 pp.

The Environmental Synthesis report consists of two parts. The first contains a detailed description of the natural environment of coastal Alabama relative to its biological, geological, and hydrological resources and processes. The second part presents a conceptual model of energy flow through major coastal ecosystems (freshwater, coastal terrestrial, estuarine, and outer continental shelf) and relates them to modified and manipulated systems (urban, industrial, and agricultural) in Mobile and Baldwin Counties.

FWS/OBS-82/43. A STEP-BY-STEP IMPLEMENTATION ON THE APPLICATION OF THE HYDROL, THERMA, AND AQUBIO COMPUTER CODES. Kenneth H. Kim. 1982. Not available.

This report presents a detailed description of implementation procedures for the computer codes developed, under the sponsorship of the Fish and Wildlife Service, for the simulation of hydrodynamic, thermal, saline, and biological concentration conditions for the assessment of the environmental impacts of power plants.

FWS/OBS-82/44. Number not used.

FWS/OBS-82/45. Number not used.

FWS/OBS-82/46. ECOLOGICAL ATLAS FOR COASTAL ALABAMA. In preparation (NCET).

FWS/OBS-82/47. SOUTHWESTERN FLORIDA ECOLOGICAL CHARACTERIZATION: AN ECOLOGICAL ATLAS. Martel Laboratories, Inc. and Mangrove Systems, Inc. 1983. v.p.

This consists of a volume of map narratives and 16 base maps plus overlays which document existing information on the biological, social, and physical characteristics of several Gulf Coastal counties of Florida. These maps and narratives are designed to aid Federal and State decision-makers, and others, with coastal planning and management, and in planning for Outer Continental Shelf oil and gas development.

FWS/OBS-82/48. PELAGIC DISTRIBUTION AND ABUNDANCE OF SEABIRDS IN THE GULF OF ALASKA AND EASTERN BERING SEA. In preparation (Region 7).

FWS/OBS-82/49. HABITAT PRESERVATION ABSTRACTS. Office of Biological Services. 1982. Not available.

Habitat Preservation Abstracts is an announcement publication intended to make the information provided by the Habitat Preservation Programs of the U.S. Fish and Wildlife Service more widely known and accessible.

FWS/OBS-82/50. Number not used.

FWS/OBS-82/51. POTENTIAL IMPACTS OF EXTENDED WATER NAVIGATION UPON MIGRATORY BIRDS OF THE UPPER U.S. GREAT LAKES. In preparation (Region 3).

FWS/OBS-82/52. ATLAS OF THE SPAWNING AND NURSERY AREAS OF GREAT LAKES FISHES. Carole D. Goodyear et al. 1982.

VOLUME I:	A SUMMARY OF GEOGRAPHIC AREA. 164 pp.
VOLUME II:	LAKE SUPERIOR. 122 pp.
VOLUME III:	ST. MARY'S RIVER. 29 pp.
VOLUME IV:	LAKE MICHIGAN. 209 pp.
VOLUME V:	LAKE HURON. 121 pp.
VOLUME VI:	ST. CLAIR RIVER. 25 pp.
VOLUME VII:	ST. CLAIR LAKE. 42 pp.
VOLUME VIII:	DETROIT RIVER. 40 pp.
VOLUME IX:	LAKE ERIE. 202 pp.
VOLUME X:	NIAGARA RIVER. 22 pp.
VOLUME XI:	LAKE ONTARIO. 117 pp.
VOLUME XII:	ST. LAWRENCE RIVER. 24 pp.
VOLUME XIII:	SPECIES REPRODUCTION CHARACTERISTICS. 153 pp.
VOLUME XIV:	BIBLIOGRAPHY. 150 pp.

This atlas is a compilation of current spawning and nursery information concerning the fishes of the Great Lakes. The complete set consists of 14 volumes. The information may be used to support permit and project reviews, impact statement reviews, planning of baseline research, and identification of data gaps.

FWS/OBS-82/53. Number not used.

FWS/OBS-82/54. Number not used.

FWS/OBS-82/55. GULF COAST ECOLOGICAL INVENTORY: USER'S GUIDE AND INFORMATION BASE. Angelo D. Beccasio et al. 1982. 191 pp.

This study provides an inventory of important ecological resources along the Gulf coast, an area of approximately 475,000 square kilometers (183,400 sq. mi.). It is intended to provide government and industry decisionmakers with valuable ecological information which will assist in the regional siting of oil and gas processing and manufacturing facilities and their respective transportation system.

FWS/OBS-82/56. ECOLOGY AND CULTURE OF SELECTED SPECIES USEFUL IN REVEGETATING DISTURBED LANDS IN THE WEST. Clinton H. Wasser. 1982. 347 pp.

Ecological information about 98 species commonly used in revegetation and reclamation projects in the western United States is included in this handbook. Each species is illustrated, and its description includes information on origin, species growth, morphological characteristics, culture, management uses and techniques, associated species, pests and diseases, and improved varieties.

FWS/OBS-82/57. MINE-RELATED STREAM ALTERATION PRACTICES FOR PROTECTION AND ENHANCEMENT OF FISH AND WILDLIFE. A. E. Robb, Jr. and C. E. Ohlsson. 1982. 142 pp.

Stream alterations adverse to biological communities are identified and measures employed to mitigate and counteract these impacts are described. This is intended to provide current information on practices for protection and enhancement of fish and wildlife resources to surface mine operators and managers.

FWS/OBS-82/58.1. AN ECOLOGICAL CHARACTERIZATION OF THE LOWER EVERGLADES, FLORIDA BAY, AND THE FLORIDA KEYS. N. Scott Schomer and Richard D. Drew. 1982. 263 pp.

The study identifies four major ecological zones which are delineated by differences in basic physical-chemical factors which in turn promote characteristic ecological communities. The four zones are: (1) terrestrial and freshwater wetlands; (2) estuarine and saltwater wetlands; (3) Florida Bay and mangrove islands; and (4) the Florida keys.

FWS/OBS-82/59. PROCEEDINGS OF THE CONFERENCE ON COASTAL EROSION AND WETLAND MODIFICATION IN LOUISIANA: CAUSES, CONSEQUENCES, AND OPTIONS. Donald F. Boesch. 1982. 256 pp.

This volume contains 16 papers and panel discussions from a conference held in Baton Rouge, LA, 5-6 October 1981. The presentations consider the causes and consequences of coastal erosion and wetland modification in Louisiana and mitigating options available to slow or reverse the rapid rate of coastal land loss.

FWS/OBS-82/60. ENERGY RELATED USE CONFLICTS FOR THE COLUMBIA RIVER ESTUARY. John Garcia et al. 1983.

VOLUME I: TEXT. 496 pp.
VOLUME II: ATLAS.

Summarizes the direct and indirect effects of projected energy-related development upon fish and wildlife in estuarine and riverine systems. Cumulative impacts on particular species and habitats are integrated and described on a site-specific basis for projected development in the Columbia River Estuary.

FWS/OBS-82/61. A METHOD FOR RANKING BIOLOGICAL HABITATS IN OIL SPILL RESPONSE PLANNING AND IMPACT ASSESSMENT. J. K. Adams, K. A. Benkert, C. Keller, and R. White. 1984. 42 pp.

A method that enables oil spill response planners to minimize the ecological impacts of oil spills by determining protection priorities for biological habitats is described. The objective of the method is to allow persons responding to an oil spill to quickly identify areas that should be protected first, second, and on to the extent that personnel and equipment are available. The last section describes an application of the method to the Louisiana Offshore Oil Port (LOOP) spill response planning area.

FWS/OBS-82/62. POTENTIAL EFFECTS OF KAPLAN, OSSBERGER, AND BULB TURBINES ON ANADROMOUS FISHES OF THE NORTHEASTERN U.S. William E. Knapp, Boyd Kynard, and Steven P. Gloss, eds. 1982. 132 pp.

The effects of turbine passage on anadromous fishes of the northeast United States were investigated in the field and laboratory. Kaplan, Ossberger, and bulb turbines were studied using Atlantic salmon smolts (Salmo salar), juvenile and adult American shad (Alosa sapidissima), juvenile blueback herring (Alosa aestivalis), striped bass (Morone saxatilis), and rainbow and steelhead trout (Salmo gairdneri). The effects of turbine size and electric power level on mortality are presented.

FWS/OBS-82/63. AN EVALUATION OF METHODS FOR ASSESSING THE EFFECTS OF FLOW FLUCTUATIONS ON STREAM FISH. M. B. Bain, J. T. Finn, L. J. Gerardi, Jr., M. R. Ross, and W. P. Saunders, Jr. 1982. 199 pp.

This study had three main components: (1) testing the applicability of the Instream Flow Incremental Methodology (IFIM) to an eastern river with daily fluctuating flows; (2) exploring some of the biological assumptions of the IFIM; and (3) developing new methods for studying fish behavior in streams with fluctuating flow. Two reaches of the Deerfield River in Massachusetts served as study sites.

FWS/OBS-82/64. INVENTORY OF TOXIC AND HAZARDOUS WASTE DISPOSAL AND DISCHARGE SITES IN THE NEW ORLEANS AND HOUSTON AREAS: USER'S GUIDE. Dames & Moore. 1982. 111 pp. Not available.

Maps of New Orleans and Houston with overlays accompany the text.

FWS/OBS-82/65. TURTLES, BIRDS, AND MAMMALS IN THE NORTHERN GULF OF MEXICO AND NEARBY ATLANTIC WATERS. Thomas H. Fritts et al. 1983. 455 pp.

Aerial line transect surveys of marine turtles, birds, and mammals were conducted in four areas of the Gulf of Mexico and nearby Atlantic waters. Data on distribution, abundance, seasonal occurrence, and habitat use are reported for each of the 88 species observed. Potential impacts of Outer Continental Shelf development are also discussed.

FWS/OBS-82/66. EFFECTS OF CONTAMINATED SEDIMENT ON FISH AND WILDLIFE: REVIEW AND ANNOTATED BIBLIOGRAPHY. Lawrence A. Olsen. 1984. 103 pp.

A review and annotated bibliography of selected literature about the effects of contaminated sediment on the biota are presented. Pollution categories that are covered include heavy metals, hydrocarbons, synthetic organic compounds, and radionuclides.

FWS/OBS-82/67. Number not used.

FWS/OBS-82/68. ECOLOGICAL MODELS OF THE MISSISSIPPI DELTAIC PLAIN REGION: DATA COLLECTION AND PRESENTATION. Robert Costanza et al. 1983. 342 pp.

This technical report consists of quantified ecosystem models with input-output matrices of the biology, hydrology, geology, and socioeconomics of the major habitats of the Mississippi Deltaic Plain region. The quantitative framework characterizes the region and provides a data base for future ecological models. Its companion document is FWS/OBS-82/69.

FWS/OBS-82/69. ECOLOGICAL CHARACTERIZATION OF THE MISSISSIPPI DELTAIC PLAIN REGION: A NARRATIVE WITH MANAGEMENT RECOMMENDATIONS. Leonard M. Bahr, Jr. et al. 1983. 189 pp.

This narrative is designed to provide a general description of the Mississippi Deltaic Plain region, and is supplemented by detailed ecological data found in FWS/OBS-82/68. These two volumes are the final products of the Mississippi Deltaic Plain Region Characterization Study. (See also series abstract on p. 36.)

FWS/OBS-82/70. Number not used.

FWS/OBS-82/71. Number not used.

FWS/OBS-82/72. ATLAS OF WETLANDS IN THE PRINCIPAL COAL SURFACE MINING REGION OF WESTERN KENTUCKY. William J. Mitsch et al. 1983. 134 pp.

This reference document contains available information on the location and description of wetland areas of the region that will assist persons involved in surface mining, and other land-use activities, with planning and management of this valuable resource.

FWS/OBS-82/73. Number not used.

FWS/OBS-82/74. APPLICATIONS OF COASTAL ECOLOGICAL CHARACTERIZATIONS: A SUMMARY OF ACTIVITIES FY-79 THROUGH FY-82. 1982. 108 pp. Not available.

FWS/OBS-83/01. THE ECOLOGY OF ALBEMARLE SOUND, NORTH CAROLINA: AN ESTUARINE PROFILE. B. J. Copeland et al. 1983. 68 pp.

Biological characteristics of this large, oligohaline estuary are discussed in this report. Declining fisheries, algal blooms in freshwater tributaries, and changing patterns of land and water use are some of the issues discussed. This report outlines current management practices for Albemarle Sound, and provides a state-of-the-art information base and ecological synthesis of the estuary and its watershed.

FWS/OBS-83/02. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN NEBRASKA AND KANSAS. J. David Aiken. 1983. 57 pp.

See series abstract on p. 82.

FWS/OBS-83/03. PROCEEDINGS OF A WORKSHOP ON CETACEANS AND SEA TURTLES IN THE GULF OF MEXICO: STUDY PLANNING FOR EFFECTS OF OUTER CONTINENTAL SHELF DEVELOPMENT. Cherry E. Keller and J. Ken Adams, eds. 1983. 42 pp.

This publication presents keynote addresses and the results of working group sessions of a conference held 6-8 April 1982 at the University of Southern Mississippi in Long Beach. Impacts of Outer Continental Shelf development on cetaceans and sea turtles and mitigation options were the focus of the workshop.

FWS/OBS-83/04. NATURAL AND MODIFIED POCOSINS: LITERATURE SYNTHESIS AND MANAGEMENT OPTIONS. Andrew N. Ash et al. 1983. 156 pp. Not available.

Pocosins are ecosystems endemic to the southeastern coastal plain of the United States. This document highlights some of the problems associated with altering pocosins to agriculture, forestry, and peat mining operation. Available literature has been synthesized, and resource management options for wildlife are described.

FWS/OBS-83/05. THE ECOLOGY OF ESTUARINE CHANNELS OF THE PACIFIC NORTHWEST COAST: A COMMUNITY PROFILE. Charles A. Simenstad. 1983. 181 pp.

This report on the estuarine channel habitats of the Pacific Northwest is one of a series of community profiles that synthesize useful information about specific natural coastal habitats. The profile describes the geomorphological, hydrological, chemical, and biological components and natural processes of the channels, their energy interchange, and interactions among adjacent habitats.

FWS/OBS-83/06. Number not used.

FWS/OBS-83/07. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN MINNESOTA AND IOWA. J. David Aiken. 1983. 64 pp.

See series abstract on p. 82.

FWS/OBS-83/08 to 83/12. These handbooks contain information on the best current practices to minimize disturbances and adverse impacts of surface mining on fish and wildlife resources. Current State and Federal legislation was reviewed to determine those practices which were most compatible with the best technology currently available, fish and wildlife plans, and reclamation plans for specific regions of the U.S. The information presented includes risks, limitations, approximate costs, and maintenance and management requirements if each practice. Plans for the restoration of specific habitats are also included.

FWS/OBS-83/08. PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN CENTRAL AND SOUTHERN APPALACHIA. Richard E. Ambrose, C. R. Hinkle, and C. R. Wenzel. 1983. 208 pp.

FWS/OBS-83/09. PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN THE GREEN RIVER-HAMS FORK REGION. Bettina R. Proctor et al. 1983. 242 pp.

FWS/OBS-83/10. PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN THE POWDER RIVER-FORT UNION REGION. Bettina R. Proctor et al. 1983. 246 pp.

FWS/OBS-83/11. PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN THE SOUTHCENTRAL U.S. Richard E. Ambrose, C. R. Hinkle, and C. R. Wenzel. 1983. 229 pp.

FWS/OBS-83/12. PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL MINED LAND IN THE UINTA-SOUTHWESTERN UTAH REGION. Bettina R. Proctor et al. 1983. 250 pp.

FWS/OBS-83/13. IDENTIFICATION OF INSTREAM HAZARDS TO TROUT HABITAT QUALITY IN WYOMING. Morris M. Skinner and Michael D. Stone. 1983. 69 pp.

Trout habitat quality can be affected by numerous physical, chemical, and biological features. Ten instream hazards, both natural and man caused, which may adversely affect trout habitat quality in western States were identified in this report. Color infrared aerial photography was used to identify specific hazards along reaches of several Wyoming rivers, and verified by on-site visits. Techniques for mitigating potential and existing hazards are presented.

FWS/OBS-83/14 and 83/15. These studies compile and synthesize existing information about the social and economic characteristics of the southwestern (FWS/OBS-83/14) and northwestern (FWS/OBS-83/15) coastal regions of Florida. This report, along with the data appendix, should prove useful for coastal planning and management. It is one in a series of coastal characterizations produced by the U.S. Fish and Wildlife Service.

FWS/OBS-83/14. FLORIDA COASTAL ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY OF THE SOUTHWESTERN REGION. Carolyn O. French and John W. Parsons. 1983.

VOLUME I: TEXT. 333 pp.
VOLUME II: PART 1 DATA APPENDIX. 295 pp.
VOLUME III: PART 2 DATA APPENDIX. 359 pp.
VOLUME IV: PART 3 DATA APPENDIX. 196 pp.

FWS/OBS-83/15. FLORIDA COASTAL ECOLOGICAL CHARACTERIZATION: A SOCIOECONOMIC STUDY OF THE NORTHWESTERN REGION. Carolyn O. French and John W. Parsons.

VOLUME I: TEXT. 306 pp.
VOLUME II: PART 1 DATA APPENDIX. 309 pp.
VOLUME III: PART 2 DATA APPENDIX. 375 pp.

FWS/OBS-83/16. OREGON ESTUARINE INVERTEBRATES: AN ILLUSTRATED GUIDE TO THE COMMON AND IMPORTANT INVERTEBRATE ANIMALS. Paul Rudy, Jr., and Lynn Hay Rudy. 1983. 226 pp.

This guide is intended for the biological field worker. Each invertebrate is fully illustrated and described. Other types of information include: possible misidentifications with similar species; ecological information; life history; and a representative bibliography.

FWS/OBS-83/17. THE ECOLOGY OF TIDAL FRESHWATER MARSHES OF THE UNITED STATES EAST COAST: A COMMUNITY PROFILE. William E. Odum, Thomas J. Smith, III, John K. Hoover, and Carole C. McIvor. 1984. 177 pp.

This is a compilation and synthesis of available data on the ecology of the tidal freshwater community. All structural and functional aspects of this distinctive estuarine ecosystem are discussed, including its geology, hydrology, biotic components, and energy, nutrient, and biomass cycling.

FWS/OBS-83/18. PROTECTING INSTREAM FLOWS IN IOWA: AN ADMINISTRATIVE CASE STUDY. Stewart W. Olive. 1983. 35 pp.

See series abstract on p. 82.

FWS/OBS-83/19. LOWER MISSISSIPPI VALLEY ECOLOGICAL INVENTORY: USER'S GUIDE AND INFORMATION BASE. A. D. Beccasio et al. 1983. 84 pp.

This study provides an inventory of important ecological resources along the lower Mississippi River, an area of some 126,200 square kilometers (48,700 square miles). This inventory is intended to provide government and industry decisionmakers with valuable ecological information which will assist in the regional siting of oil and gas processing and manufacturing facilities and their respective transportation systems.

FWS/OBS-83/20. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN GEORGIA. Terry Ehrlich. 1983. 28 pp.

See series abstract on p. 82.

FWS/OBS-83/21. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN MICHIGAN AND WISCONSIN. Mary Ray White. 1983. 73 pp.

See series abstract on p. 82.

FWS/OBS-83/22. OPPORTUNITIES TO PROTECT INSTREAM FLOWS IN TEXAS, OKLAHOMA, AND ARKANSAS. Mary Ray White. 1983. 94 pp.

See series abstract on p. 82.

FWS/OBS-83/23. ECOLOGY OF THE SAN FRANCISCO BAY TIDAL MARSHES: A COMMUNITY PROFILE. Michael Josselyn. 1983. 102 pp.

This document compiles available published and unpublished scientific literature to describe the current status and ecology of the remaining tidal marshes in San Francisco Bay.

FWS/OBS-83/24. Number not used.

FWS/OBS-83/25. ECOLOGY OF TUNDRA PONDS OF THE ARCTIC COASTAL PLAIN: A COMMUNITY PROFILE. John E. Hobbie. June 1984.

This profile synthesizes data on the ecology of the thousands of small, shallow ponds that comprise an important wetland community on the tundra of the Arctic Coastal Plain of northern Alaska. The community is important for many species of migratory waterfowl and shorebirds that use the ponds for feeding and breeding. Effects of oil production activities in this area are a major issue facing managers of this wetland resource.

FWS/OBS-83/26. SUBSIDENCE IN COASTAL LOUISIANA: CAUSES, RATES, AND EFFECTS ON WETLANDS. Donald F. Boesch et al. 1983. 30 pp.

This report analyses current rates and causes, both natural and man-made, of ground subsidence in coastal areas of Louisiana. An accelerated subsidence rate has been observed. Much land loss is attributable to a relative lowering of wetland surface below the level adequate to support vegetation.

FWS/OBS-83/27. HUMAN DEMOGRAPHIC IMPACTS ON FISH AND WILDLIFE RESOURCES FROM ENERGY DEVELOPMENT IN RURAL WESTERN AREAS. Margaret G. Thomas. 1983. 357 pp.

This workbook provides a mechanism for analysis of human demographic impacts on fish and wildlife due to large-scale energy developments in Western States. It focuses on impacts related to land use conversions and the accompanying reduction in quantity or quality of habitat and on impacts related to population growth and their demands or impacts on fish and wildlife resources. The intended users are developers, resource managers, and planners. The workbook was designed for use with proposed coal or oil shale projects, but other energy development projects can be evaluated if projected work force requirements are known.

FWS/OBS-83/28. PLAYA WETLANDS AND WILDLIFE ON THE SOUTHERN GREAT PLAINS: A CHARACTERIZATION OF HABITAT. R. Wayne Nelson, William J. Logan, and Emily C. Weller. 1983. 163 pp.

This characterization is a synthesis of knowledge about the habitat values of playa wetlands to migratory and resident wildlife. Variables which may affect the value of playa wildlife habitat included watershed size and the water surface area and depth; characteristics of vegetation; land use, particularly grazing and cultivation; and the extent of modification, particularly excavating and diking. The Southern Great Plains playa wetland region encompasses parts of the Texas Panhandle, adjacent eastern New Mexico, the Oklahoma Panhandle, southwestern Kansas, and southeastern Colorado.

FWS/OBS-83/29. PLAYA WETLANDS AND WILDLIFE ON THE SOUTHERN GREAT PLAINS: A GUIDE TO HABITAT MANAGEMENT. R. Wayne Nelson, William J. Logan, and Emily C. Weller. 1983. 99 pp.

This report describes management techniques that can be implemented on playa wetlands of the Southern Great Plains to make them more attractive to wildlife and fish. Most techniques can be implemented in conjunction with other farm and ranch operations. In fact, some techniques require the use of agricultural practices to accomplish management objectives. The report is aimed at the wildlife manager, the landowner, and the sportsman.

FWS/OBS-83/30. MARINE BIRDS OF THE SOUTHEASTERN UNITED STATES AND GULF OF MEXICO. PART III: CHARADRIIFORMES. R. B. Clapp, D. Morgan-Jacobs, and R. C. Bank. 1983. 853 pp.

Information on the seasonal distribution and abundance of 22 species of marine birds of the order Charadriiformes that occur in the coastal southeastern United States has been compiled and mapped from the literature. This information was gathered in an attempt to assess the possible effects of offshore oil development on populations of marine birds in the Southeast.

FWS/OBS-83/31. SEASONAL ABUNDANCE AND HABITAT USE PATTERNS OF COASTAL BIRD POPULATIONS ON PADRE AND MUSTANG ISLAND BARRIER BEACHES. Brian R. Chapman. 1984. 73 pp.

The report assesses the impact of the Ixtoc I oil spill on coastal bird populations and provides baseline information about the distribution and seasonal abundance of the avian species that use south Texas beach and nearshore habitats. The section on results and discussion describes the annual, seasonal, and daily cycles of avian abundance, distribution, and diversity. The species profiles sections provide distribution, status, seasonal abundance, habitat-use patterns, and oil vulnerability information for 26 species.

FWS/OBS-83/32. POCOSINS: A CHANGING WETLAND RESOURCE. Charles B. McDonald, Andrew N. Ash, and Emilie S. Kane. 1983. 22 pp.

This public-interest booklet describes pocosins and how they are changing. These freshwater wetlands are found on the Atlantic coastal plain from Virginia to Georgia, with approximately 70% in North Carolina in flat, upland areas. Modifications to make them more productive for agriculture, forestry, and other uses, and the effects of these modifications on fish, wildlife and other natural resources in and around pocosins, are discussed.

FWS/OBS-83/33. FIELD METHODS AND STATISTICAL ANALYSES FOR MONITORING SMALL SALMONID STREAMS. Carl L. Armour, Kenneth P. Burnham, and William S. Platts. 1983. 200 pp.

This publication contains information pertaining to monitoring programs which may be used to evaluate the effects of land use practices on small salmonid streams in the western United States. Information includes an approach for designing a monitoring program, variables which may be used with field measurement techniques, and statistical tests for evaluating data.

FWS/OBS-83/34. SOME LIMNOLOGICAL CHARACTERISTICS OF EIGHT LIMESTONE EXCAVATIONS IN SOUTH FLORIDA. Mark Hudy and Richard W. Gregory. 1984. 84 pp.

This study characterizes selected abiotic and biotic features of eight limestone excavation lakes in south Florida to help identify mitigation needs for future rock mining operations. Creation of additional littoral areas is one of several recommended mitigation techniques. An annotated bibliography of relevant references is also provided.

FWS/OBS-83/35. IMPACTS OF COAL SURFACE MINING ON 25 MIGRATORY BIRD SPECIES OF HIGH FEDERAL INTEREST. Judith S. Armbruster, ed. 1983. 348 pp.

Potential impacts of coal surface mining on 25 migratory birds of high Federal interest are examined. Literature searches on each species have been used to develop individual species accounts. Information on species distribution, life history, habitat requirements, population status, effects of disturbance, and management techniques are included. Potential impacts from coal surface mining, recommendations for mitigation measures, and habitat reclamation suggestions are also presented.

FWS/OBS-83/36. THE PLANT INFORMATION NETWORK (PIN) DATABASE: COLORADO, MONTANA, NORTH DAKOTA, UTAH, AND WYOMING. Phillip L. Dittberner and Michael R. Olson. 1984. 786 pp.

This publication provides introductory information on the Plant Information Network (PIN) and a print-out of PIN data. The PIN was a computerized data base containing information on native and naturalized vascular plants of five western States. Information was included on over 5,000 species found in Colorado, Montana, North Dakota, Utah, and Wyoming. Because of funding restrictions PIN is no longer operated as a computerized data base. This publication makes the PIN data available to resource managers, planners, and others who have a continuing need for this information.

FWS/OBS-84/01. FEASIBILITY OF USING OIL SHALE WASTEWATER FOR WATERFOWL WETLANDS. Bruce D. Snyder and Janet L. Snyder. 1984. 290 pp.

This study evaluated the use of selected wastewaters from oil shale development to establish wetland habitats for waterfowl. It also evaluated the capacity of the wetlands as an innovative wastewater treatment system. Minimum standards for water quality and quantity, and a comparison of the cost and effectiveness of wetland wastewater treatment vs. conventional treatment technologies were two of the study results.

FWS/OBS-84/02. THE ECOLOGY OF EELGRASS MEADOWS OF THE ATLANTIC COAST: A COMMUNITY PROFILE. Gordon W. Thayer, W. Judson Kenworthy, and Mark S. Fonseca. 1984. 147 pp.

This report, one of a series of community profiles produced by the Fish and Wildlife Service, synthesizes scientific literature and data on the eelgrass community of the Atlantic coast from North Carolina to Nova Scotia. It complements FWS/OBS-82/25 on the seagrasses of South Florida.

FWS/OBS-84/03. UTILIZATION OF SURFACE COAL MINE WASTEWATER FOR CONSTRUCTION OF A NORTHERN PIKE SPAWNING/REARING MARSH. Richard W. Gregory, Allen A. Elser, and Thomas Lenhart. 1984. 44 pp.

This report describes one example where wastewater from an energy development site (coal mine operation) was used to enhance the fisheries of an adjacent reservoir. The details of this report provide an example of what considerations may be necessary for similar projects; illustrate potential problem areas in the planning, construction, and operation of such a project; and stimulate ideas for developing other innovative uses of wastewater for fish and wildlife habitat enhancement.

FWS/OBS-84/04. ECOLOGY OF PACIFIC NORTHWEST COASTAL SAND DUNES: A COMMUNITY PROFILE. Alfred M. Wiedemann. 1984. 130 pp.

Dune habitats along the North American Pacific Coast are assessed in this report. Plant communities and animal life are identified and linked to various dune forests, meadows, marshes and lakes. Impacts of urban development, off-road vehicle traffic, and the introduction and spread of European beachgrass are discussed.

FWS/OBS-84/05. NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM: GUIDELINES FOR REVIEWING PERMITS. Howard D. Tait. 1984. v.p.

This handbook is designed primarily for use by Fish and Wildlife Service field office personnel in the review of NPDES section 402 permits. Emphasis is on providing access to information to be used in screening NPDES permits for relevance to fish and wildlife values. An annotated bibliography is included.

FWS/OBS-84/06, 84/07, and 84/14. These three volumes document the initial findings, survey design, and survey protocol of the 1982 National Fisheries Survey. The survey was conducted to provide statistically valid data on the status of fish communities in the United States, and, as such, represents a baseline assessment of the biological quality of the Nation's waters.

FWS/OBS-84/06. 1982 NATIONAL FISHERIES SURVEY. VOLUME I. TECHNICAL REPORT: INITIAL FINDINGS. Robert D. Judy, Jr., Paul N. Seeley, Thomas M. Murray, Susan C. Svirsky, Molly R. Whitworth, and Lee S. Ischinger. 1984. 140 pp.

FWS/OBS-84/07. 1982 NATIONAL FISHERIES SURVEY. VOLUME III: SURVEY PROTOCOL. Robert D. Judy, Jr. and Paul N. Seeley. 1984. 43 pp.

FWS/OBS-84/08. CONDUCTING A FERC ENVIRONMENTAL ASSESSMENT: A CASE STUDY AND RECOMMENDATIONS FROM THE TERROR LAKE PROJECT. Stewart W. Olive and Berton L. Lamb. 1984. 62 pp.

This publication discusses the negotiations surrounding the licensing of a hydroelectric power plant facility on Kodiak Island. The focus is on the interactions of the Federal Energy Regulatory Commission (FERC), the U.S. Fish and Wildlife Service, State agencies, and private interests. Recommendations and strategies for conducting successful negotiations of this kind are provided.

FWS/OBS-84/09. THE ECOLOGY OF DELTA MARSHES OF COASTAL LOUISIANA: A COMMUNITY PROFILE. James G. Gosselink. 1984. 134 pp.

This document reviews and synthesizes ecological information and data on the extensive marshes of the Mississippi River Deltaic Plain. This area represents about 22% of the total coastal wetlands of the 48 conterminous United States. A complex mixture of human activities and natural processes has caused rapid degradation of this highly productive and valuable ecological community.

FWS/OBS-84/10. ENDANGERED AND THREATENED SPECIES ON U.S. AIR FORCE INSTALLATIONS. Rebecca Howard, Anjanette Perry, and Penny Herring. 1984. 137 pp.

This report lists by State, Air Force command, and taxonomic class, all endangered and threatened species that occur on U.S. Air Force installations. This information on species occurrence and habitat requirements is intended to aid the Air Force when planning activities, including maneuvers and construction projects, on its property.

FWS/OBS-84/11. COMPARISON OF THE USE OF THE HABITAT EVALUATION PROCEDURES (HEP) AND THE INSTREAM FLOW INCREMENTAL METHODOLOGY (IFIM) IN AQUATIC ANALYSES. Carl L. Armour, Richard J. Fisher, and James W. Terrell. 1984. 30 pp.

The Habitat Evaluation Procedures (HEP) are designed for quantifying habitat values and documenting impacts of habitat changes on fish and wildlife resources. The Instream Flow Incremental Methodology (IFIM) is specifically designed for simulating and quantifying impacts of changes in flow, channel morphology, or water quality on fish, invertebrates, and instream recreational activities. This paper contains information on the: (1) differentiating features and recommended uses of the two methods for environmental assessment; and (2) development and use of Suitability Index (SI) curves. The discussion is limited to consideration of the affects of habitat alterations on fish habitat.

FWS/OBS-84/12. PROCEEDINGS OF THE NATIONAL WETLAND VALUES ASSESSMENT WORKSHOP. J. Henry Sather and Patricia J. Ruta Stuber, tech. coord. 1984. 100 pp.

This summarizes information resulting from the Wetland Values Assessment Workshop held in Alexandria, VA from May 23-25, 1983. Forty wetlands experts from 17 sponsoring agencies discussed wetland value assessment, focusing on the method for wetland functional assessment recently prepared for the Federal Highway Administration. The workshop resulted in the development of a National Wetlands Values Assessment Methodology which incorporates food chain, socio-economic, hydrology, habitat, and water quality values of wetlands.

FWS/OBS-84/13. ATLAS OF WADING BIRD AND SEABIRD NESTING COLONIES IN COASTAL LOUISIANA, MISSISSIPPI, AND ALABAMA: 1983. Cherry E. Keller, Jeffrey A. Spendelow, and Richard D. Greer. 1984. 127 pp.

Aerial surveys of waterbird colonies in coastal Louisiana, Mississippi, and Alabama conducted in 1983 were used to develop the maps presented in this report. The major objective of the survey was to provide up-to-date locations of active colony sites. The location, species composition, habitat, and an overall estimate of colony size were recorded for each of the 188 active colonies observed.

FWS/OBS-84/14. 1982. NATIONAL FISHERIES SURVEY - VOLUME II: SURVEY DESIGN. W. D. Glauz. 1984. 77 pp.

See abstract on page 96.

FWS/OBS-84/15. INSTREAM WATER TEMPERATURE MODEL. Instream Flow Information Paper 16. Fred D. Theurer, Kenneth A. Voos, and William J. Miller. 1984. [321] pp.

This water temperature model is designed to predict instream water temperatures based on either historical or synthetic hydrological, meteorological, and stream geometry conditions. The model is applicable to any size watershed or river basin. It is divided into four sections: Applications; Physical processes and math models; User's manual; and Software support documentation.

FWS/OBS-84/16. A FRAMEWORK FOR ASSESSING THE IMPACTS OF ACIDIC DEPOSITION ON FOREST AND AQUATIC RESOURCES: RESULTS OF A WORKSHOP FOR THE NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM. James E. Roelle, Austin K. Andrews, Gregor T. Auble, David B. Hamilton, Richard L. Johnson, and James F. Sisler. 1984. 80 pp.

The National Acid Precipitation Assessment Program has planned a series of assessments to analyze the costs and benefits of various approaches to deal with the impacts of acidic deposition. The first of these assessment, to be completed in 1985, will focus on the extent of current damages (both physical and economic) due to acidic deposition. This report describes the results of a planning workshop, held in April 1983, whose purpose was to define the objectives of 1985 assessment with respect to forest and aquatic resources, and to achieve a common understanding among participants regarding alternative assessment approaches.

FWS/OBS-84/17. MAP PROJECTIONS FOR USE WITH THE GEOGRAPHIC INFORMATION SYSTEM. John E. Lee and J. Michael Walsh. 1984. 60 pp.

This document has been prepared to assist users of the Geographic Information System (GIS) in understanding and using the various map projections which are available. Currently, 20 map projections may be used in the GIS.

FWS/OBS-84/18. AN OVERVIEW OF MAJOR WETLAND FUNCTIONS AND VALUES. J. Henry Sather and R. Daniel Smith. 1984. 75 pp.

This report was prepared to provide background information for participants at the National Wetland Values Assessment Workshop held at Alexandria, Virginia, in May 1983. Workshop proceedings have been published as: Sather, J. Henry and Patricia J. Ruta Stuber. 1984. Proceedings of the National Wetland Assessment Workshop. FWS/OBS-84/12. 100 pp.

FWS/OBS-84/19. PHYSICAL IMPACTS OF SMALL-SCALE HYDROELECTRIC FACILITIES AND THEIR EFFECTS ON FISH AND WILDLIFE. Haydon Rochester, Jr., Thomas Lloyd, and Martha Farr. 1984. 191 pp.

This manual provides an introduction to small-scale hydroelectric (< 30 MW) technology, and its impacts on fish and wildlife and their habitats, for fisheries or wildlife biologists or other nonengineer readers. The text emphasizes the technical aspects of small-scale hydro, with a very limited discussion of institutional social, legal, and economic factors.

FWS/OBS-84/20. DISTRIBUTION AND ABUNDANCE OF THE FOREST BIRDS OF GUAM: RESULTS OF A 1981 SURVEY. John Engbring and Fred L. Ramsey. 1984. 54 pp.

This survey represents the first systematic and comprehensive effort to obtain baseline data on the distribution and abundance of Guam's avifauna. The results of the 1981 survey and historical record document the advanced state of the decline in avian distribution, densities, and population sizes, and are used to identify the key remaining habitats for Guam's native birds. Possible causes of the decline, such as disease, introduced predators, pesticides, and habitat loss, are discussed and recommendations for future studies are made.

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77/30, 78/82, 80/44

WATERFOWL
81/44, 84/01
See also AQUATIC BIRDS, MARINE
BIRDS, SEABIRDS, WADING
BIRDS, WATER BIRDS

WEST COAST
80/03

WEST VIRGINIA
78/84, 81/39.2, 81/40.2

WETLANDS
76/09, 78/97, 78/98, 79/31,
81/02, 81/38, 81/44, 82/22,
82/59, 82/72, 83/26, 83/28,
83/29, 84/01, 84/12, 84/18
See also RIPARIAN

WHITE RIVER (Vermont)
76/07

WILDLIFE
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76/30, 76/31, 76/32, 76/33,
76/34, 77/42, 77/66, 78/86,
81/47

WILLAPA BAY
81/03

WINTER NAVIGATION
80/61

WINTER WATER
77/06

WISCONSIN
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WORKSHOP
76/09, 76/27, 78/30, 80/18,
80/27, 80/28, 80/30, 80/59,
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See also CONFERENCE, SYMPOSIUM

WYOMING
77/31, 77/40, 77/42, 77/44,
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YELLOWSTONE RIVER
79/36

AVAILABILITY INFORMATION

		Availability					
FWS/OBS #	Abstract on p.	EELUT	NCET	WELUT	OTHER	NTIS	GPO
76/01.1	4					PB250521	
76/01.2	4					PB250522	
76/02	4					PB251738	
76/03	4					PB253152	
76/04	4					PB255294	
76/05	5					PB254853	
76/06	5					PB257080	
76/07	5					PB268247	
76/08	5					PB264507	
76/09	5					PB258079	
76/10	6					PB255295	
76/11	6					PB257427	
76/12	6					PB257428	
76/13	6					PB257078	
76/14	6					PB257079	
76/15	7					PB257429	
76/16	7					PB257426	
76/17	7					PB298457	
76/18	7					PB298894	
76/19	7					PB267962	
76/20.1	8	X				PB266166	
76/20.2	8	X				PB266167	
76/20.3	8					PB283465	
76/20.5	8					PB287863	
76/20.6	8	X				PB291612	
76/20.7	8					PB287862	
76/20.8	9	X				PB293587	
76/20.9	9					PB116055	
76/21	9					PB272991	
76/22	9					PB268241	
76/23	9					PB260772	
76/24	9					PB265243	
76/25	10					PB265231	
76/27	10					PB268396	
76/28	10			X		(not sent)	
76/29	10					PB263470	
76/30	10					PB263471	
76/31	10					PB263472	
76/32	10					PB263352	
76/33	10					PB263245	
76/34	10					PB263246	
76/35	11					PB261960	
76/36	11					NP21172	
76/37	11					PB268031	

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
77/01	11			X		PB298290	
77/02	11		X			PB298420	
77/03	12					PB281089	
77/04	12					PB272263	024-010-00434-7
77/05	12			X		PB265173	
77/06	12			X			
77/07	12		X			PB286216	
77/08	12		X			PB297864	
77/09	13					PB265316	
77/10	13					PB268006	
77/11	13					(not sent)	
77/12[a]	13					PB281442	
77/13	13					PB281443	
77/14	13					PB281444	
77/15	13					PB281445	
77/16.1	14					PB281446	
77/16.2	14					PB281447	
77/16.3	14					PB281448	
77/16.4	14					PB281449	
77/16.5	14					PB281450	
77/19	14					PB268597	
77/20	14			X		PB272153	
77/21	14					PB269274	024-010-00464-9
77/22	15					PB269275	024-010-00463-1
77/23	15					PB268028	
77/24	15					PB282375	
77/25	15					PB275935	
77/26	15					PB276243	
77/27	15					PB272974	
77/28	16			X			
77/29	16			X		PB276046	
77/30	16					PB279402	
77/31	16			X		PB275996	
77/32	16			X		PB275995	
77/33	16			X		PB276024	
77/34	16			X		PB275964	
77/35	16			X		PB275997	
77/36	16					PB279496	
77/37	17					PB286564	
77/38	17					PB276057	
77/39	17			X		PB276058	
77/40	17			X		PB276059	
77/41	17					PB276060	
77/42	17					PB279388	
77/43	18					PB279389	
77/44	18					PB279390	
77/46	18	X				PB285824	

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
77/47	18					PB272993	
77/48	18					PB276691	
77/49	18					PB275916	
77/50	19					PB278284	
77/51							
(Vol. I)	19					PB80-183825	024-010-00545-9
(Vol. II)	19					PB80-187685	024-010-00546-7
77/52	19					PB278169	
77/54	19					PB286977	
77/55	19					PB286871	
77/56	19					PB283145	024-010-00460-6
77/57	20					PB277959	
77/58[b]	20			X		PB276036	
77/59	20			X		PB276037	
77/60	20			X		PB276038	
77/61	20			X		PB279544	
77/62	20					PB279545	
77/63	21					PB286848	
77/64	21					PB298431	
77/65	21			X		PB289906	
77/66	21			X		PB280172	
78/01	21					PB283508	
78/02	21					Brochure	
78/04	22			X		PB298530	024-010-00495-9
78/07	22					PB286849	
78/08	22		X			Brochure	
78/09	22					PB80-119647	
78/10	22					PB80-119654	
78/12 (Vol. I)	23						024-010-00444-4
78/12 (Vol. II)	23						
78/12 (Vol. III)	23						024-010-00446-1
78/12 (Vol. IV)	23						024-010-00447-9
78/12 (Vol. V)	23						024-010-00448-7
78/12 (Vol. VI)	23						024-010-00449-5
78/13	23			X		PB289995	024-010-00486-0

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
78/14	23	X		X		PB282177	
78/16	23	X				PB290571	
78/17	23	X				PB290572	
78/18	24	X		X		PB298253	
78/19	24	X				PB298554	
78/20	24			X		PB287846	024-010-00478-
78/21	24					PB286198	024-010-00516-5
78/22	24					PB279079	
78/23	24					PB286171	024-010-00476-
78/25	25			X		PB287363	
78/26	25			X		PB286870	
78/29	25	X		X		PB283658	
78/30	25	X		X		PB285422	
78/31	26					PB286552	
78/32	26			X		PB298199	024-010-00507-6
78/33	26			X		PB287815	
78/34	26					PB285967	
78/35	26			X		PB286277	
78/36	26			X		PB286278	
78/37	26			X		PB298135	
78/38	26			X		PB298146	
78/39	26			X		PB286801	
78/40	26			X		PB286356	
78/41	26			X		PB286279	
78/42	26			X		PB285982	
78/43	26			X		PB286943	
78/44	26			X		PB286746	
78/45	26			X		PB286355	
78/46	26			X		PB286745	
78/47	26			X		PB286230	
78/48	27					PB286931	
78/49	27					Map[c]	
78/50	27					Map[c]	
78/51	27					Map[c]	
78/52	27					Map[c]	
78/53	27					Map[c]	
78/54	28		X			PB283677	
78/55	28					PB80-165988	
78/56	28			X		PB298316	
78/57[d]	28					PB291757	
78/58	28					PB286276	
78/59	28						
78/60	29			X		PB287817	
78/61	29						

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
78/64	29						
78/65	29	X				PB286260	
78/66	29					PB285795	024-010-00473-8
78/68	30			X		PB287849	
78/69	30					PB285906	
78/70	30					PB298614	
78/71							
(Vol. I)	30					PB290469	
(Vol. II)	30					PB290470	
78/74	30					PB297635	
78/75	31					PB291330	
78/76	31					PB299240	
78/77	31					PB288128	024-010-00494-1
78/78	31						
78/79	31	X		X		PB298246	
78/80	32		X			PB297143	024-010-00511-4
78/81	32	X		X		PB298353	
78/81A	32	X		X		PB80-134489	
78/82	32	X		X		PB298261	
78/83	32					PB293307	
78/84	33			X		PB298304	
78/85	33	X		X		PB290155	
78/86	33			X		PB298049	
78/87	20	X				PB298176	
78/88	20	X		X		PB298177	
78/89	20	X		X		PB298178	
78/90	34	X		X		PB298857	
78/91	34	X		X		PB298895	
78/92	34	X		X		PB297563	
78/93	20	X		X		PB81-164949	
78/94	20	X		X		PB81-166878	
78/95	34	X		X		PB298604	
78/96	34			X			
78/97	35					PB298326	
78/98	35					PB298375	
79/02	35			X		PB80-203714	
79/03	35			X		PB80-146202	
79/05	36					PB80-198468	
79/06[e]	36					PB80-219579	
79/07[e]	36		X				

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
79/08	36					PB80-147945	
79/09	36					PB80-133069	
79/10	36					PB80-133077	
79/11[f]	37					PB81-109928	
79/12	37					PB81-109936	
79/13	37					PB81-109944	
79/14	37		X			PB81-109951	
79/15	37		X			PB81-109969	
79/16	37			X		PB80-112451	
79/19	38	X		X			
79/19-A	38	X					
79/22							
(Vol. I)	38						
(Vol. II)	38						
(Vol. III)	38						
79/23	38					PB80-127285	
79/24	38		X			PB80-114787	
79/25	39					PB80-203698	
79/26	39			X			
79/27	39			X		PB80-146228	
79/28	39		X			Brochure	
79/30	39					PB82-161621	
79/31	39			X		PB80-168784	
79/32	39		X			Brochure	
79/33	40	X		X		PB164923	
79/35	40					PB80-121510	
79/36	40					PB81-236069	
79/37	40			X		PB80-162761	
79/39	40					PB80-148315	
79/40	41					PB81-195737	
79/41	41		X			PB81-195745	
79/42	41		X			PB81-195753	
79/43	41		X			PB81-131956	
79/44	41					PB80-131956	
79/45	41		X			PB81-195729	
79/46	41						
79/48.1	41	X					
79/48.2	42	X					

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		EELUT	NCET	WELUT	OTHER	NTIS	GPO
79/48.3.1	42						
79/48.3.2	42	X					
79.48.3.3	42	X					
79/48.3.4	42	X					
79/48.3.5	42						
79/49	42			X			
80/02	46		X				
80/03	46					PB80-178965	024-010-00541-6
80/04	47		X			PB80-192834	
80/05	47					PB82-116054	
80/06	47						
80/07	47					PB81-137853	
80/08	47			X			
80/09	47			X			
80/10	48					PB81-211997	
80/11	48	X		X		PB81-166522	
80/12	48	X		X		PB81-166530	
80/13	48	X		X		PB81-165417	
80/14	48	X		X		PB81-165375	
80/15	48		X				
80/16	49					PB80-162209	
80/17	49			X		PB81-166886	
80/19	49		X			PB81-137804	
80/20	49		X			PB81-137812	
80/22	50		X			PB83-150748	
80/22.1	50		X				
80/23	50		X			PB84-122142	
80/24	50	X		X		PB82-130816	
80/25	50	X		X		PB82-130824	
80/26	50						
80/27	51					PB81-165649	
80/28	51					PB80-192453	
80/29							
(Vol. 1)	51					PB81-168056	
(Vol. 2)	51					PP81-168064	
(Vol. 3)	51					PB81-168072	
(Vol. 4)	51					PB81-168080	
(Vol. 5)	51					PB81-168098	
(Vol. 6)[g]	51					PB81-168106	

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		EELUT	NCET	WELUT	OTHER	NTIS	GPO
80/30	51					PB80-197692	
80/32	51					PB82-125949	
80/33	52	X				PB81-159917	
80/34	52					PB81-175762	
80/35	52			X		PB82-130147	
80/37	52		X			PB81-212599	024-010-00593-9
80/38	52					PB80-200439	
80/39	53					PB80-213101	
80/40.1	53	X		X		PB80-221708	
80/40.2	53					PB81-160442	
80/40.3	53						
80/40.4	53						
80/40.5	53						
80/40.6	53						
80/40.7	53						024-010-00629-3 (Set of 9)
80/40.8	53						
80/40.9	53						
80/40.10	53						
80/40.11	53						
80/40.12	53					PB83-141564	
80/40.13	53	X				PB84-120005	
80/40.14	53					DE84-011779	
80/40.15	53					PB84-103357	
80/40.16	53	X				PB84-177641	
80/40.17	53	X				PB84-177385	
80/40.18	53	X					
80/41	54					PB81-212508	
80/42	54			X		PB81-164931	
80/43	54			X		PB81-115966	
80/44[h]	55					PB82-124157	
80/45	55		X			PB83-155416	
80/46.1	55		X			PB83-155424	
80/46.2	55		X			PB83-155432	
80/47.1	55		X			PB83-155440	
80/47.2	55		X			PB83-155457	
80/48.1	55		X			PB83-155465	
80/48.2	55		X			PB83-155473	
80/49	55		X			PB83-155481	
80/50	56		X			PB81-247660	
80/51	56					PB81-102964	024-010-00559-9
80/52	56						

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
80/53	56			X		PB81-234916	
80/54	56	X					
80/55	56			X		Brochure	
80/56	57				R2		
80/57	57			X		PB81-234957	
80/58	57			X		PB81-235848	
80/59	57					PB81-204083	
80/60	57				R3		
80/62	58				R3		
80/62.1	58				R3		
80/64	58	X		X		PB82-125956	
80/65	58			X			
80/67	58					PB81-166340	
80/68	59			X			024-010-00620-0
81/01	59		X			PB82-217100	
81/02	59						
(Vol. 1)			X				
(Vol. 2)			X			PB82-190596	
(Vol. 3)						PB82-190620	
(Vol. 4)						PB82-190638	
(Vol. 5)						PB82-190653	
(Vol. 6)						PB82-190695	
81/03	59		X			PB81-212722	
81/04	60						
(Vol. 1)			X			PB82-131426	
(Vol. 2)			X			PB82-131434	
81/05	60	X		X		PB82-141359	
81/06	60			X		PB82-126491	
81/07	60	X				PB82-141367	
81/08	61	X				PB83-145003	
81/09	61	X				PB83-144063	
81/11	61					PB81-203192	
81/12	61		X			PB82-128687	
81/13	62					PB82-140187	
81/14	62						
81/15	62		X			PB81-233041	
81/16[e]	36		X			PB83-157669	
81/17	62					PB82-140369	
81/22	63		X			PB82-117508	

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
81/24	63					PB82-256108	
81/25	63	X				PB82-130030	
81/26	63					PB83-126003	
81/27	64		X			PB81-247181	
81/29	64	X					
81/30[e]	64					PB82-130162	024-010-00596-3
81/31	64					PB82-114141	
81/32	64		X			PB82-130782	
81/33	65					PB83-128025	
81/34	65	X				PB83-152413	
81/36	65					PB82-116914	
81/37	65		X			PB82-199837	
81/38	65					PB82-130808	
81/39.1	66	X					
81/39.2	66	X					
81/39.3	66	X					
81/41	66		X			PB83-190017	
81/43	66			X		PB82-134222	
81/44	67			X		PB82-195934	
81/45	67						
81/46	67			X		PB82-241712	
81/47	67					PB82-139882	
81/48	68			X		PB82-195439	
81/49	68		X			PB83-138438	
81/50	68					PB82-182452	
81/51	68					PB82-230699	
81/52	68		X			PB83-138740	
81/54	69					PB82-205717	
81/55	69		X			PB82-217118	
82/01	69					PB82-195850	024-010-00604-8
82/02	69						
(Vol. 1)						PB82-199753	
(Vol. 2)						PB82-199761	
82/03	69		X			PB83-250811	
82/04	70		X			PB83-197038	
82/06	70		X				
82/09	70	X		X			
82/10	70			X			
82/10.A	70					PB84-209154	
82/10.1	70		X	X		PB82-237447	
82/10.2	70					PB82-228519	024-010-00610-2

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
82/10.3	70					PB82-239906	024-010-00611-1
82/10.4	70			X		PB82-239914	024-010-00613-7
82/10.5	70					PB82-239922	024-010-00612-9
82/10.6	70					PB82-239930	024-010-00614-5
82/10.7	70					PB82-239948	024-010-00615-3
82/10.8	70					PB82-239955	024-010-00616-1
82/10.9	70			X		PB82-242322	024-010-00617-0
82/10.10	70					PB82-237462	024-010-00618-8
82/10.11	70					PB82-239963	024-010-00619-6
82/10.12	70			X		PB83-150615	
82/10.13	70			X		PB83-143172	
82/10.17	70			X		PB83-143164	
82/10.18	70			X		PB83-143180	
82/10.19	70			X		PB83-148213	
82/10.20	70					PB83-148197	
82/10.21	70					PB83-144428	
82/10.22	70					PB83-147033	
82/10.23	70					PB83-142513	
82/10.24	70			X		PB83-147041	
82/10.25	70			X		PB83-147348	
82/10.26	70			X		PB83-147058	
82/10.27	70			X		PB83-143156	
82/10.28	70			X		PB83-142505	
82/10.29	70			X		PB83-147066	
82/10.30	70					PB83-147074	
82/10.31	70						
82/10.32	70			X		PB84-118041	
82/10.33	70			X		PB84-118090	
82/10.34	70			X		PB84-129469	
82/10.35	70			X		PB84-155589	
82/10.36	70					PB84-129451	
82/10.37	70			X		PB84-118439	
82/10.38	70			X		PB84-118421	
82/10.39	70			X		PB84-118033	
82/10.40	70			X		PB84-128529	
82/10.41	70			X		PB84-129501	
82/10.42	70			X		PB84-118413	
82/10.43	70			X		PB84-131507	
82/10.44	70			X		PB84-155688	
82/10.45	70					PB84-154871	
82/10.46	70					PB85-122711	
82/10.47	70			X		PB84-155597	
82/10.48	70			X		PB84-131143	
82/10.49	70			X		PB84-131150	
82/10.50	70		X				
82/10.51	70		X				

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
82/10.52	70		X				
82/10.53	70		X				
82/10.54	70		X				
82/10.55	70			X		PB84-183987	
82/10.56	70			X		PB84-209600	
82/10.57	70		X				
82/10.58	70		X				
82/10.59	70		X	X			
82/10.60	70			X		PB84-196948	
82/10.61	70					PB84-155605	
82/10.62	70			X		PB84-166735	
82/10.63	70			X		PB84-209121	
82/10.64	70			X		PB85-164762	
82/10.65	70			X		PB85-121069	
82/10.66	70			X		PB85-171643/AS	
82/10.67	70			X		PB85-174787/AS	
82/10.69	70			X		PB85-135010	
82/10.70	70			X		PB85-146470	
82/10.71	70			in prep.			
82/10.72	70					PB85-146462	
82/10.74	70		X				
82/10.75	70		X				
82/10.76	70		X				
82/10.77	70		X				
82/10.78	70		X				
82/10.79	70			X		PB85-133742	
82/10.80	70			X		PB85-147197	
82/10.81	70			X		PB85-123966	
82/10.82	70			X			
82/10.83	70			X		PB85-133759	
82/10.84	70			X		PB85-135028	
82/10.85	70			X		PB85-146488	
82/11.1	76		X			PB83-226506	
82/11.2	76		X			PB83-226183	
82/11.3	76		X			PB83-226191	
82/11.4	76		X			PB83-226217	
82/11.5	76		X			PB84-237866	
82/11.6	76		X			PB84-235001	
82/11.7	76		X			PB84-237858	
82/11.8	76		X			PB84-235696	
82/11.9	76		X			PB84-235084	
82/11.10	76		X			PB84-234392	

	Abstract	Availability					
FWS/OBS #	on p.	EELUT	NCET	WELUT	OTHER	NTIS	GPO
82/11.11	76		X			PB84-235019	
82/11.12	76		X			PB84-235860	
82/11.13	76		X				
82/11.14	76		X			PB84-235076	
82/11.15	76		X			PB84-214121	
82/11.16	76		X			PB84-214147	
82/11.17	76		X			PB84-214138	
82/11.18	76		X			PB84-214113	
82/11.19	76		X			PB84-214097	
82/11.21	76		X			PB84-214089	
82/11.22	76		X				
82/11.23	76		X				
82/11.24	76		X				
82/11.25	76		X				
82/12	78		X				
82/13.1	78					DE82-020946	
82/13.2	78					DE82-020943	
82/13.3	78					DE82-020953	
82/15	79						
82/16	79						
82/17	79						
82/18	79						
82/20	79					PB82-264995	
82/21	80		X			PB83-180661	
82/22	80			X		PB83-128702	
82/23	80			X		PB83-128132	
82/24	80			X		PB83-124628	
82/25	80		X			PB83-140574	
82/26	81					PB83-131052	024-010-00628-5
82/27	81					PB83-183103	
82/29	81					PB83-165910	024-010-00647-1
82/30	81			X		PB83-165928	
82/31	82			X		PB83-166389	
82/32	82		X			PB84-194687	
82/33	82			X		PB83-124974	
82/34	82			X		PB83-169482	
82/35	82			X		PB83-169490	
82/36	82					PB83-128124	
82/37	83		X				
82/38	83			X		PB83-166058	
82/42	84					PB83-190009	

FWS/OBS #	Abstract on p.	EELUT	NCET	WELUT	OTHER	NTIS	GPO
		Availability					
82/47	84		X				
82/52	85						
(Vol. I)			X			PB83-157321	
(Vol. II)			X			PB83-157339	
(Vol. III)			X			PB83-157347	
(Vol. IV)			X			PB83-157354	
(Vol. V)			X			PB83-157362	
(Vol. VI)			X			PB83-157370	
(Vol. VII)			X			PB83-157388	
(Vol. VIII)			X				
(Vol. IX)			X			PB83-157404	
(Vol. X)			X			PB83-157412	
(Vol. XI)			X			PB83-157420	
(Vol. XII)			X			PB83-157438	
(Vol. XIII)			X			PB83-157446	
(Vol. XIV)			X			PB83-157453	
82/55	85		X			PB83-135939	024-010-00635-8
82/56	85			X		PB83-167023	024-010-00638-2
82/57	86			X		PB83-246041	
82/58.1	86					PB83-141978	
82/59	86					PB83-152777	
82/60	86		X			PB84-113505	
82/61	86		X			PB84-245612	
82/62	87						
82/63	87						
82/65	87					PB84-144138	
82/66	87		X			PB84-231844	
82/68	88					PB83-239012	
82/69	88		X			PB84-182864	
82/72	88		X			PB84-165356	
83/01	88		X			PB84-148352	
83/02	82			X		PB83-241042	
83/04	89		X			PB84-180389	
83/05	89		X			PB84-209709	
83/07	82			X		PB83-239467	
83/08	89			X		PB83-237073	

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
83/09	89			X		PB83-252064	
83/10	89			X		PB83-237081	
83/11	89			X		PB83-252049	
83/12	89			X		PB83-252056	
83/13	90			X		PB83-252171	
83/14	90						
(Vol. I)			X			PB84-174119	
(Vol. II, pt. 1)			X			PB84-174101	
(Vol. II, pt. 2)			X			PB84-174093	
(Vol. II, pt. 3)			X			PB84-174127	
83/15	90						
(Vol. I)			X			PB84-174200	
(Vol. II, pt. 1)			X			PB84-174218	
(Vol. II, pt. 2)			X			PB84-174192	
83/16	91				R1		
83/17	91		X			PB84-209501	
83/18	82			X		PB84-122977	
83/19	91		X			PB84-114768	024-010-00643-9
83/20	82			X		PB84-119221	
83/21	82			X		PB84-128917	
83/22	82			X		PB84-128925	
83/23	92		X			PB84-194307	
83/25	92		X			PB85-155679	
83/26	92		X			PB84-143700	
83/27	92			X		PB84-158013	024-010-00646-3
83/28	93					PB84-158112	024-010-00645-5
83/29	93					PB84-166776	
83/30	93		X			PB84-158773	
83/31	93		X			PB84-236876	
83/32	94		X				
83/33	94			X		PB84-178623	024-010-00649-8
83/34	94		X			PB85-159077	
83/35	94			X		PB84-182898	024-010-00650-1
83/36	95			X			
84/01	95			X		PB84-187897	024-010-00651-0
84/02	95		X			PB85-179471	
84/03	95			X		PB85-134484	
84/04	95		X			PB84-226968	
84/05	96		X			PB85-171478	
84/06	96			X		PB85-120327	
84/07	96			X		PB85-120343	

FWS/OBS #	Abstract on p.	Availability					
		EELUT	NCET	WELUT	OTHER	NTIS	GPO
84/08	96			X			PB84-209618
84/09	96		X				PB85-155687
84/10	96		X				PB85-158939
84/11	97			X			PB85-119915
84/12	97			X			
84/13	97		X				PB85-164101
84/14	96			X			PB85-120335
84/15	97			X			PB85-196392/AS
84/16	98			X			PB85-119899
84/17	98			X			PB85-198992/AS
84/18	98			X			PB85-119907
84/19	98			X			PB85-128049
84/20	99		X				PB85-168987

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[a] Full set 77/12 to 77/16.5 available from NTIS as PB281441.

[b] Three-volume set 77/58 to 77/60 available from NTIS as PB276035.

[c] Available at State Fish and Game agencies in the respective States.

[d] Superseded by 80/54.

[e] Contact NCET for map availability information.

[f] Full set 79/11 through 79/15 available from NTIS as PB81-109910.

[g] Maps available from FWS Region 5 only.

[h] Full set, FWS/OBS 80/45 through 80/49 available from NTIS as PB83-155408.

[i] Contact NCET for additional availability information.

[j] Contact FWS Region 5 for additional availability information.

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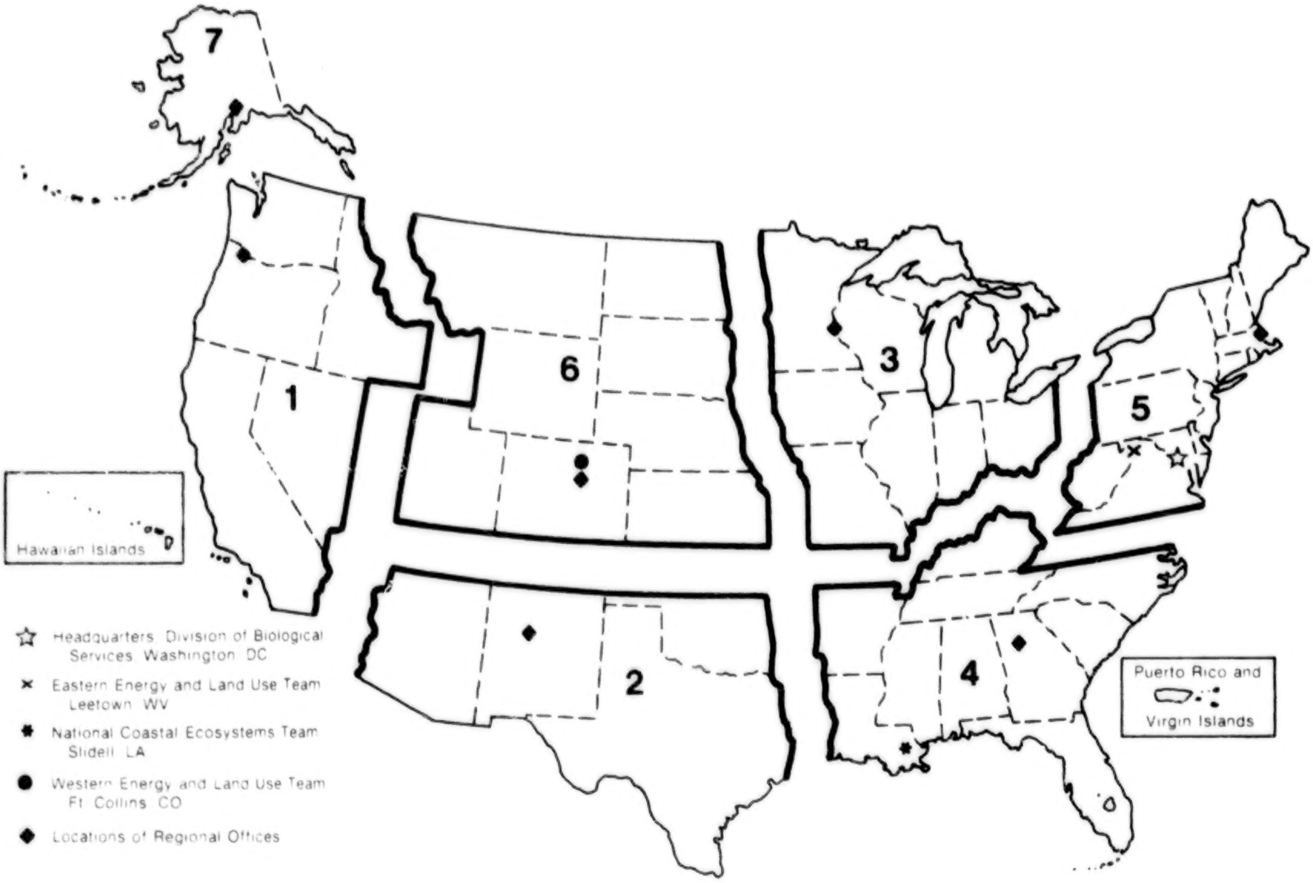
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Hawaiian Islands
Puerto Rico and
Virgin Islands
☆ Headquarters, Division of Biological Services, Washington, DC
× Eastern Energy and Land Use Team Leetown, WV
✱ National Coastal Ecosystems Team Slidell, LA
● Western Energy and Land Use Team Ft. Collins, CO
◆ Locations of Regional Offices

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Federal Building, Fort Snelling
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END

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